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ABSTRACT

In 1983, the California Legislature authorized and funded 15 Teacher Education and Computer Centers (TECCs) to provide staff development services to teachers and administrators. Incorporating earlier staff development programs into a single statewide system, TECCs provide: (1) computer technology instruction, including classroom applications; (2) teaching methodology training; (3) mathematics and science training; and (4) strategies and training for site-based staff development programs, including administering the AB 551 staff development grants. In addition, the SMERC (San Mateo Educational Resources Center) Library Computer Center (San Mateo County) provides an educational software library and clearinghouse to assist TECCs with software evaluation. This mandatory annual evaluation report describes the TECCs major accomplishments and challenges using data from site visits, interviews (with TECC staff, policy board members, and State Department of Education and Legislative staff), evaluation surveys, data base services and training documentation, and document analysis. While the TECCs are already a high payoff investment in educational reform, this report recommends (1) reallocating funds within TECCs to increase curriculum and capacity-building services; (2) strengthening the TECC Network through comprehensive planning, closer cooperation with the State Department of Education, and an improved data base for service documentation; and (3) legislative action to increase staff development incentives. Appendices contain: (1) TECC statutory authorization; (2) three evaluation instruments; and (3) a summary of 1983-84 TECC evaluation survey results. (BS)

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REPORT ON THE 1983-84 EVALUATION OF THE

TEACHER EDUCATION AND COMPUTER CENTERS

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CALIFORNIA STATE DEPARTMENT OF EDUCATION
Bill Honig, Superintendent of Public Instruction
Sacramento, 1984

REPORT ON THE
1983-84 EVALUATION OF THE

TEACHER EDUCATION AND COMPUTER CENTERS

Prepared by:

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PROGRAM EVALUATION AND RESEARCH DIVISION

This legislative report, which was prepared by the Program Evaluation and Research Division, California State Department of Education, was published by the Department, 721 Capitol Mall, Sacramento, CA 95814-4785. Any questions regarding the report should be addressed to Barbara Brandes or William Padia in the Program Evaluation and Research Division (phone: [916] 445-0297). The report was distributed under the provisions of the Library Distribution Act and *Government Code* Section 11096.

1985

Education Code Section Requiring This Report

44680.07. The Superintendent of Public Instruction shall do all of the following:

(a) Designate the regions within the state to be served by teacher education and computer centers with the advice of the county superintendents of schools.

(b) Approve the plans of each center for staff development.

(c) Coordinate and facilitate communication among the centers by, among other things, making exemplary program models available to all centers.

(d) Authorize the allocation of funds to centers based on the approved plans. Funds appropriated or apportioned for purposes of this article in any fiscal year, may be expended in subsequent fiscal years.

(e) Report, by April 15 of each year, to the State Board of Education, the Legislature, and the Governor as to the effectiveness of the centers in providing, and assisting in, staff development.

(f) Provide for an educational software library and clearinghouse to assist the centers with software evaluation.

(g) Authorize centers to receive federal funding for any of their functions.

(Added by Stats. 1983, Ch. 498. Effective July 28, 1983. See note following Section 1296.)

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EXECUTIVE SUMMARY

Authorization for 15 Teacher Education and Computer Centers (TEC Centers, or TECCs) to provide staff development services to teachers and administrators on a regional basis was codified in the Hughes-Hart Educational Reform and Finance Act of 1983 (SB 813, Chapter 498, Statutes of 1983). The TEC Centers were previously established and funded in the Budget Act of 1982. They are charged with providing staff development resources in all areas of the curriculum, but especially in mathematics, science, technology, and other curriculum areas for which there are significant shortages of qualified, certificated teachers.

The TEC Centers incorporated the staff development functions formerly addressed by the Professional Development and Program Improvement Centers and the School Resource Centers to provide training in elements of effective instruction and to provide resources to build school site capacities for self-sustaining staff development. In addition, each TEC Center was charged with design and implementation of a computer demonstration center to support the acquisition of computing skills by teachers and students. A Software Clearinghouse and a teacher retraining project were also established to provide support for TEC Center activities.

Purpose of the Report

Education Code Section 44680.07 requires an annual evaluation of "the effectiveness of the centers in providing, and assisting in, staff development." This report describes the major accomplishments and challenges of the TEC Centers at this time and suggests the types of additional support and resources that are needed for the centers to meet the challenges. Primary audiences for

the evaluation are the State Board of Education, the Legislature, the Governor, the Superintendent of Public Instruction and the State Department of Education (SDE), and the TEC Centers. SB 813 assigns responsibility for the annual evaluation of the TEC Centers to the Superintendent. This evaluation was conducted by a team from the Special Studies and Evaluation Reports unit in the Program Evaluation and Research Division.

Major Findings and Implications

Total TEC Center Training, 1983-84

During the year, the TEC Centers offered a total of 2,466 courses, representing a total of 28,711 training hours. There were 68,726 participants in this training. The greatest portion of TECC training activity (nearly two-thirds) was devoted to computer use. The area of instruction, or teaching methodology, accounted for the next largest portion (about 18 percent) of total TECC training activity in terms of number of training hours. In contrast, the curriculum area accounted for approximately 10 percent of total training time.

There was considerable variation among the 15 TEC Centers in the level of effort devoted to each training area. For example, one center provided all of its training in the computer area, stating that curriculum and instruction were adequately covered by other staff development providers, especially in the county offices. Two other centers provided more training in instruction than in any other area. And one center divided its training activity approximately evenly among the areas of curriculum, instruction, and computer use.

Computer Training

The TEC Centers provide instruction in computer technology, including training in computer awareness, use of hardware and software, classroom

applications, and programming. During 1983-84 the TEC Centers statewide conducted 1,612 computer training sessions representing a total of 13,100 training hours. There were 43,918 participants in these training activities. Of the computer training workshops offered, 87 percent were at an introductory, or awareness, level; 11 percent were at a comprehensive, or advanced level; and 2 percent were training of trainers courses.

There is no doubt that the TEC Centers have scored a major accomplishment in that they have made great progress toward bringing computer awareness and skills to California teachers. As the showcase for computer activity in California education, the TEC Centers should continue to be state of the art in hardware, software, and training. In order to remain at the forefront in technology training, the TEC Centers should no longer conduct awareness training as their predominant offering in the computer area. The development of a strategic plan for TEC Center involvement in technology would be the beginning of a process to sift out the priorities in the computer area and to balance these with other staff development priorities.

Instruction, or Teaching Methodology, Training

Training in instruction, or teaching methodology, includes pedagogy, instructional techniques, learning styles, and classroom management. The TEC Centers reported offering a total of 295 courses in instructional methodology during the year. These courses included 5,111 training hours for 8,712 participants.

Training in instruction tends to be more intensive in terms of training time than training offered in other areas. The average number of hours per course was 17.3 for instruction, 11.2 for computer use, and 9.7 for curriculum.

Math and Science

One of the most striking findings is the relatively low level of activity in math and science training, not only from TEC Centers but from other education agencies as well.

Between February 1983 and February 1984, the TEC Centers conducted an average of 8.5 math training workshops representing an average of 130 total hours of math training. The median number of individuals participating in math training at each center was 140. During the same period of time, the TEC Centers conducted an average of six science workshops representing an average of 27 total hours of science training. The median number of individuals participating in science training at each center was 84.

These numbers are in contrast to the large number of sessions in the computer area. Center directors' estimates of math training as a percentage of total trainings hovered around 5 percent to 10 percent; in science, the figure was closer to 5 percent, or less. TEC Center directors feel that more staff development in both math and science is needed. In response to a mail survey, 11 out of 14 directors said that there is a need for their centers to provide more math staff development than is currently offered. All 14 directors responding to the survey said that there is a need for their centers to provide more science staff development.

The reasons why the TEC Centers are providing less math and science staff development than is needed include lack of client demand, higher priority in other areas (especially computers), lack of qualified trainers, lack of resources, and insufficient time to develop a plan for math and science staff development. While it is understandable that the TEC Centers have not done more, there is an expectation that they will begin to make a significant

contribution to the overwhelming staff development needs in curriculum, especially math and science.

AB 551 School Staff Development Programs

During 1982-83 the TEC Centers assumed responsibility for administering AB 551 programs, including providing training and assistance in proposal writing, selecting grant recipients, and coordinating local projects. Management of AB 551 programs was previously the responsibility of the SDE. The total allocation for AB 551 during 1983-84 was $3,353,902. The average grant amount was $5,273. Grants were received by a total of 636 schools, of which 179 were elementary and 457 were secondary schools. Most (77.5 percent) AB 551 programs are currently devoted to computer staff development.

In our interviews with TECC staff, we found overwhelming acclamation for the AB 551 program. This expression of support for AB 551 was especially noteworthy from those TECC directors who conceded that they devote relatively little staff time to AB 551. It is currently one of the few incentive programs for staff development at the site level, and it is structured to capture much of the essence of good staff development. Several TEC Centers have established other grant programs modeled in part after AB 551.

Staff Development Strategies and Delivery Models

Staff development services provided by the TEC Centers include direct training and capacity-building services in support of site-based staff development programs. At the present time, a majority (79 percent) of TECC training is offered at an introductory, or awareness, level. Approximately one-half (51 percent) of all TECC training consists of a single session. TECC staff are caught between the pressure to do many things at a relatively superficial level, on the one hand, and a recognition that the only way they can have a major impact is by leveraging their influence in various ways, on the other. Most

centers have already conducted (or plan to conduct in the near future) some type of training-of-trainers activity; and there seems to be a consensus among the directors that this will be a major thrust of future TECC activity. In the long term, the centers will have to rely on trainer cadres and other leveraging activities to meet the needs within their regions.

While a few centers are exemplary in attempting to direct a large portion of their resources toward empowering schools and districts to conduct their own staff development programs, capacity-building is the type of service most in need of augmentation by the TEC Centers overall. From the perspective of a regional staff development network, such as the TEC Centers, the optimal strategy--both in terms of impact and of resource management--is to assist schools and districts in developing staff development plans and linking them to the resources needed to carry out those plans, with the major impetus for staff development coming from the local agencies. For the TEC Centers to exert an optimal influence on school personnel, there must be a corresponding local commitment to staff development.

Organizational Relationships Involving the TEC Centers

The TEC Centers have a complex organizational and governance structure, with various leadership roles and lines of authority shared by regional policy boards and executive boards, local education agencies (i.e., county offices of education designated to administer TEC Center budgets), and the Superintendent of Public Instruction. SB 813 also conveys a legislative intent that the TEC Centers will constitute a statewide staff development network and that within their own regions individual TEC Centers will take an active role in developing partnerships with other staff development providers, institutions of higher education (IHEs), and business and industry.

Most of the organizational relationships involving the TEC Centers were not explored in depth during this evaluation. However, considerable attention was devoted to examining relationships between the TEC Centers and the SDE because this seems to be an especially critical time in the development of their respective roles in the TECC program. To a lesser extent the evaluation included an examination of relationships among the 15 TEC Centers and partnerships with business and industry and with IHEs. The report includes a description and analysis of these relationships.

Formal links between the TEC Centers and both IHEs and business and industry occur as the result of statutory language regarding composition of TEC Center policy boards. A few centers have also launched imaginative efforts to establish relationships with IHEs and with business and industry. The best example of such a partnership with IHEs is that with the California Math Project. However, in general, the link between the TEC Centers and these other sectors is not yet strong.

The SDE has not yet designed a systematic approach to linking the various developmental and policy units of the SDE with the TEC Centers. In general, there is a need for the SDE to provide more organizational leadership of the TECC program. The SDE is uniquely positioned to influence state-level educational policy, and the TEC Centers currently have a stronger opportunity than any other local agency to effect partnerships among all of the regional and local agencies that can contribute to solutions of our staff development needs.

Major Accomplishments and Challenges of the TEC Centers

Two purposes of this evaluation were to summarize the major accomplishments of the TEC Centers to date and to identify the challenges that the TEC Centers must meet. These judgments by the evaluators are based on a synthesis of all the information gathered for the study.

Major accomplishments. In less than two years the TEC Centers have:

- Become an effective regional staff development network
- Adapted to a complex governance structure
- Begun to implement delivery models that use the most effective staff development practices
- Made great progress toward bringing computer awareness and skills to California teachers
- Successfully assumed responsibility for administering AB 551 programs
- Provided training to school staffs in instructional methodology, math, science, and other areas of the curriculum
- Begun to create partnerships with IHEs, business, and industry

Challenges. The major challenges that the TEC Centers must meet are as follows:

- Provide comprehensive staff development services with limited resources.
- Respond to regional and statewide staff development needs over time.
- Provide training that is more intensive and includes follow-up.
- Provide more services in support of site-based staff development programs.
- Remain state of the art in instructional uses of the computer and educational software.
- Provide more computer training that is integrated with curriculum.
- Increase services in math, science, and other areas of the curriculum.
- Increase partnerships with IHEs and with business and industry.

Not surprisingly, some of the significant accomplishments of the TEC Centers are closely related to the challenges that they must now meet. As relatively new agencies the TEC Centers have made a commendable beginning in becoming an effective regional network and in providing many of the staff

development resources and services that are needed to accomplish their broad mission. They are already a high-payoff investment in educational reform. Their challenges for the future are to increase the breadth and depth of their services, to the extent that resources and the state of the art permit, and to strengthen their role as major staff development providers in California.

The educational reform movement in California is currently placing great emphasis on strengthening the curriculum. Through SB 813 and current priorities of Superintendent Honig and the SDE, the TEC Centers are being pressed to become part of this curriculum improvement effort by providing more staff development resources combining content and instructional methodology in all areas of the curriculum. Given the relatively minor role that the TEC Centers have had in curriculum so far, accomplishing this will require a significant change of direction. The recent effort by many TEC Centers to offer more computer training that is integrated with content is a natural bridge to more staff development in curriculum.

Support and Resources Needed to Meet Challenges

In order to meet their challenges, the TEC Centers should consider increasing their efforts in certain areas by redirecting a portion of their total allocation to such activities, especially curriculum and capacity-building services. It was evident during 1983-84 that the TEC Centers needed additional funds to accomplish their mission. The Legislature responded to this need and appropriated an additional $5.1 million for 1984-85, giving the TEC Center program a total allocation of $11.78 million. While the mission is so large that it will always stretch resources to provide comprehensive staff development services to California schools, the new allocation will enable the young TEC Center program to grow substantially. In the judgment of the evaluators, the

following additional support and resources are now needed to enable the TEC Center program to meet current challenges:

- o Strengthening of the TEC Center network through:
  - A comprehensive planning process for the network linked to assessment of needs and priorities in each region
  - A closer cooperative relationship between the SDE and the TEC Centers
  - An improved data base to document services and training
- o Recognition by the Legislature and others of the danger of overburdening the TEC Centers
- o Action by the Legislature and others to increase incentives for staff development

I. INTRODUCTION

Authorization of 15 Teacher Education and Computer Centers[1] (TEC Centers, or TECCs) to provide staff development services to teachers and administrators on a regional basis was codified in the Hughes-Hart Educational Reform and Finance Act of 1983 (SB 813, Chapter 498, Statutes of 1983). The TEC Centers are charged with providing staff development resources in all areas of the curriculum, in instructional use of computers, and in instructional methodology and with providing technical assistance to support school-based staff development programs. (See Appendix A for the statutory language.)

The Mission of the TEC Centers

The TEC Centers were created as part of former Governor Jerry Brown's Investment in People Program and were originally established and funded in the Budget Act of 1982-83. Reflecting the focus of the Investment in People Program, the Budget Act required that two-thirds of local TECC funding support improved mathematics and science education. The codified authorization of the TEC Centers in SB 813 removed the stipulation of a specific amount or portion of TECC funds for mathematics and science staff development but retained an emphasis on staff development resources in "mathematics, science, technology, and other curriculum areas for which there are significant shortages of qualified, certificated teachers." In addition to math, science, and computer education, the TEC Centers are charged with providing staff development for teachers and administrators across the curriculum, including reading, writing, humanities, and the arts.

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[1] SB 813 authorized "15 or more" TEC Centers to be established so as "to provide staff development resources to all parts of the state." An initial decision was made to establish 19 centers. However, the original 19 TEC Centers were consolidated into 15 by the incorporation of 4 L.A. County TEC Centers into 1.

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The emphasis on computer education is integral to the TECC mission. The Investment in People initiative made a strong case for upgrading the computer use skills of California students since future life-styles will be heavily influenced by the computer. Computer literacy training for both teachers and students was identified as a way to meet this need.

The reference to the problem of teacher shortages in certain areas of the curriculum conveys a legislative intent that, in addition to providing resources for professional development, the TEC Centers should also be engaged in retraining of teachers to help solve the problem of teacher shortages in areas such as math and science. This retraining component of the TECC mission requires staff development resources that are much more intensive than those needed to promote professional development of teachers in areas in which they are already qualified.

Each TEC Center was made responsible for the staff development functions formerly addressed by the Professional Development and Program Improvement Centers and the School Resource Centers. These functions include training in elements of effective instruction and provision of resources to build school site capacities for self-sustaining staff development.

The teaching methodology TEC Center function is a major carry-over service from activities of the Professional Development and Program Improvement Centers. Research on instructional strategies associated with improved student achievement is used to design training for teachers in motivation and learning theory, specific strategies for diagnosing student learning needs, prescription of appropriate learning basics, and reinforcing, monitoring, and adjusting of student progress. Central to the TEC Centers' delivery of instructional methodology training is the training-of-trainers concept, whereby trainees later become trainers themselves and provide classroom follow-up to other teachers.

Another aspect of the TECC mission is the integration of the direct training function with a capacity-building function. The TEC Centers must be responsive not only to short-term staff development needs by making appropriate training resources available but also to the long-term need to empower local staff to plan and conduct their own staff development programs. During the past year, the TEC Centers assumed responsibility for the administration of AB 551 programs, the major goal of which is to provide small grants to schools for their own staff development activities. The capacity-building functions of the TEC Centers as set forth in SB 813 include the following:

- Assessment of school staff development needs;
- Development of school staff development plans;
- Cost-effective use of existing resources;
- Evaluation of local programs;
- Awarding of staff development program grants pursuant to Article 1 of AB 551 and evaluation of their use.

The goal of creating partnerships between the TEC Centers and other staff development providers, institutions of higher education (IHEs), and with the private sector is another important part of the TECC mission. SB 813 stipulates that local TEC Center governing boards (policy boards) have at least one representative from IHEs and from business and industry.

In-service training for elementary and secondary teachers has historically been provided though individual enrollment in postsecondary courses in IHEs. Connections to the teaching process and sustained relationships for improved instruction were presumed but rarely played out. The TEC Centers were encouraged from their inception to develop closer cooperative relationships with IHEs. The TEC Centers were located to reflect the general attendance areas of The California State University system (see Figure 1.1).

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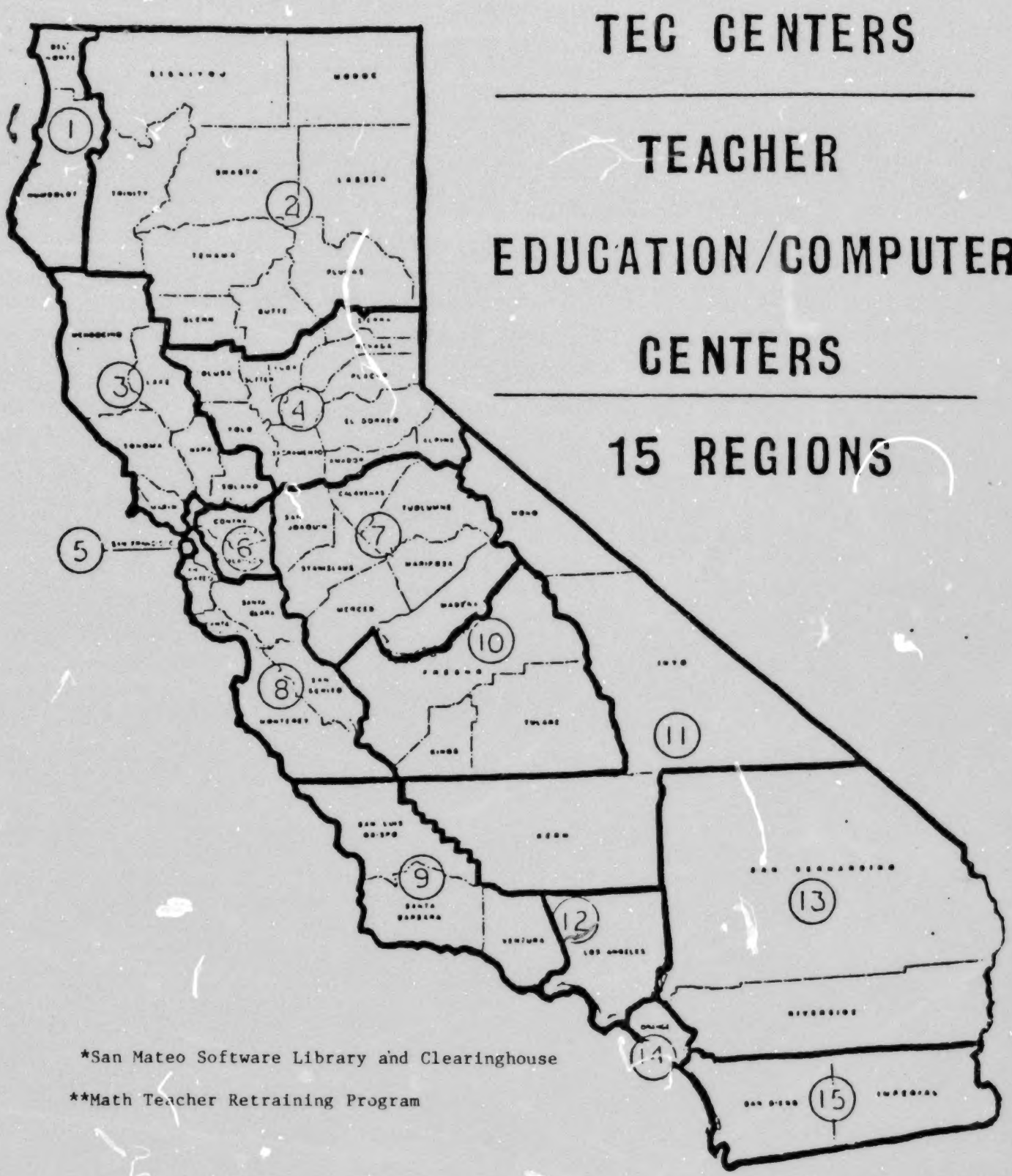
Figure 1.1--TEC CENTER SITES



*San Mateo Software Library and Clearinghouse

**Math Teacher Retraining Program

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The TEC Centers were also encouraged to identify and procure resources--both financial and instructional--from business and industry. Because the private sector is considerably more sophisticated in computer technology and richer in resources than the educational community, the TEC Centers were encouraged to identify and pursue private sector resources.

While the TECC mission is broad and complex, the overall intent is to provide some coherence in the content and delivery of staff development while at the same time allowing for considerable regional flexibility. Decision-making authority over each TEC Center is shared by regional policy boards and executive boards, but the legislation also gives the State Department of Education (SDE) a strong overall leadership role in the TECC program. Each TEC Center is given the charge of coordinating a major portion of all staff development activities within each region and particularly to mobilize and coordinate staff development resources and activities in colleges and universities and in business and industry.

Historical and Current Context of the TEC Centers

A variety of staff development programs have operated concurrently in California over the past 10 to 15 years. Falling under the general rubric of teacher assistance centers, Federal Teacher Centers, School Resource Centers, and Professional Development and Program Improvement Centers have provided a setting and context for teachers and schools to have access to resources, receive training, and build school site capacity for their staff development activities.

Federal Teacher Centers were originally funded under federal legislation (PL 94-842/1976) and subsequently folded into the block grant (Chapter 2 of the Education Consolidation and Improvement Act). In California, seven centers were funded for the 1983-84 school year. The starting point of Federal Teacher

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Center staff development activities is teacher needs, rather than training packages or curriculum implementation efforts. Teachers are both clients and providers of training, and the agencies broker other staff development services which they cannot provide themselves.

School Resource Centers, funded under state legislation (Article 2 of AB 551/1977), assisted school personnel with staff development activities designed to improve the instructional process, human development, and counseling skills. Like the Federal Teacher Centers, a collaborative governance structure was adopted to meet general center objectives to assist schools in planning, implementing, and evaluating local staff development programs (initially in Article 1 schools). School Resource Centers helped schools with needs assessment, curriculum, and training of trainers and leadership training in an effort to promote and improve school site staff development activities.

Professional Development and Program Improvement Centers (PDPICs), also funded under state legislation (AB 4151/1968 and AB 920/1974), were designed specifically to strengthen the instructional techniques of classroom teachers. Initially they served grades K-8 and were later extended to K-12. Operating with the assistance of advisory boards, these centers served teachers, aides, and administrators with teaching and instructional improvement programs in reading and mathematics. Diagnostic and prescriptive instruction, clinical supervision, follow-up, and administrative involvement were key features of the approach.

The TECC initiative was intended to incorporate these earlier programs into a single statewide system for providing staff development on a regional basis. The dominant focus of each approach was folded into the new initiative, and new agencies were built in areas where none existed before. The character of each TEC Center builds on and reflects the staff development legacy within

the region. While most regions historically had been served by some form of staff development center, several regions had not had such agencies; thus, their configuration represents a wholly new organization.

Although the TEC Centers now have a great deal of visibility as well as a very significant role in providing staff development to school personnel, there are a variety of other major statewide staff development programs and many local programs operated at the county, district, and school levels. To keep the TECC effort in perspective, it is instructive to note that TECC staff housed in county offices of education are often greatly outnumbered within their own county offices by other staff development providers with other responsibilities. Major statewide staff development programs other than the TEC Centers include the Special Education Resource Network (SERN), the Bilingual Teacher Training Programs, and the Centers for Educational Improvement Network. Each of these agencies has responsibilities that are relatively distinct from those of the TECC program.

Organization and Governance of the TEC Centers

The TEC Centers are located to reflect the general attendance areas of The California State University campuses, which results in a geographically diverse network spanning county lines. Profiles of the 15 TEC Centers portraying their diversity are shown in Table 1.1. Figure 1.2 depicts the approximate number of teachers within each TECC region. County superintendents in each designated TECC region select one of their county offices as the local education agency (LEA) to house the TECC operations. In regions where there are multiple county offices, the superintendents have the option of establishing an executive board to serve as a forum for resolving problems and reviewing policy issues.

TEC Centers are governed by policy boards, composed of a majority of teachers. Policy boards work with TECC staff to set service priorities and

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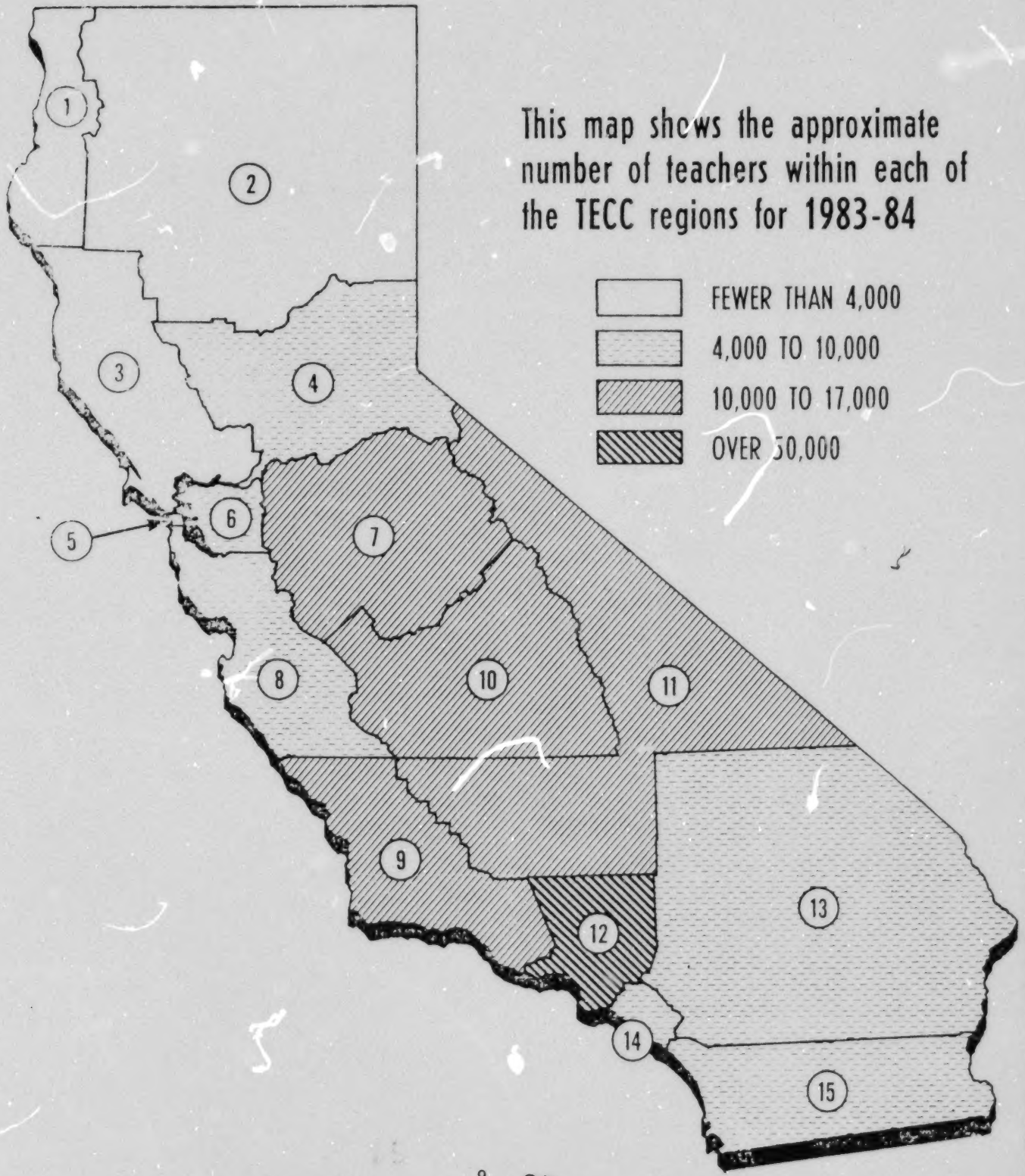
Table 1.1

Profiles of the 15 TEC Centers

TECC county region/LEAs	Number of professional staff (in FTE)	General fund support for 1983-84	Number of counties	Number of teachers (approximate)
1. Humboldt	2.80	$ 227,845	2	1,025
2. Tehama	4.10	331,325	9	3,824
3. Marin	3.00	315,576	6	7,465
4. Sacramento	3.80	332,544	11	10,565
5. San Francisco	2.50	228,046	1	2,580
6. Alameda	3.05	323,279	2	12,257
7. Stanislaus	2.00	312,770	7	8,173
8. Santa Clara	3.00	378,833	5	16,985
9. Ventura	5.58	298,497	3	7,260
10. Kings	4.40	313,475	3	8,019
11. Kern	4.00	308,068	3	4,046
12. Los Angeles	14.40	1,516,642	1	50,925
13. Riverside	4.00	413,578	2	12,769
14. Orange	4.50	352,186	1	13,721
15. San Diego	4.00	390,968	2	14,144

Figure 1.2

APPROXIMATE NUMBER OF TEACHERS IN EACH TECC REGION, 1983-84



coordinate with LEAs to oversee TECC functions. Policy boards also have the responsibility, with the concurrence of the county office of education acting as the LEA, to adopt a center budget and plan and to select center staff.

The Superintendent of Public Instruction has final authority for the TEC Center program. Responsibilities of the Superintendent and the SDE include designation of the TECC regions, with the advice of county superintendents; approving center plans and authorizing allocation of funds to the centers; facilitating communication among the centers; and evaluating the effectiveness of the centers. The SDE has assigned consultants to assist TEC Center personnel and members of policy boards and executive boards. The Superintendent also has the authority to set aside money from the total TECC allocation to fund exemplary projects and support services.

TEC Center funding is based on an average daily attendance (a.d.a.) formula and for 1983-84 included a basic operating budget ($205,000) and regional geographic adjustments based on the percent of total state water and land mass within each region. The purpose of the geographic adjustments is to give consideration to variation in travel costs. The 1983-84 statewide budget for the TECC program was $6.68 million. Of this total, $6.04 million was allocated to the centers. The remainder was reserved to support a software clearinghouse and a math retraining project.

Staff Development Services of the TEC Centers

Staff development services of the TEC Centers cover three major areas:

- Training for classroom teachers and school staff
- Technical assistance to support school-based staff development programs
- Instructional use of computers

The training function of the TEC Centers includes both content (i.e., curriculum) and methodology (i.e., pedagogy). SB 813 stipulates that TECC training should include:

- Activities to promote the principal's ability to support instructional improvement and the teacher's ability to diagnose learning needs
- The development of program content
- The use of multiple instructional approaches
- The use of student assessment data

In the area of assistance to support local staff development programs, the TEC Centers are responsible for awarding and overseeing AB 551 grants to schools within their regions. Technical assistance is also provided for other site-based staff development programs, including school improvement, categorical programs, and district-developed activities. A central goal of these activities is to empower local staff to provide their own training and renewal programs on an ongoing basis. This objective is pursued through direct and referral services to other agencies and consulting services to assist individual school staffs to plan, implement, and evaluate their own programs of staff development.

Each TEC Center was charged with providing a computer demonstration center to support the acquisition of computing skills by teachers and administrators. School staff are trained in:

- Use of computers as teaching aids
- Criteria for school acquisition and use of computer equipment and software
- The evaluation of computer-related materials
- Methods of integrating the use of computers into the routine activities of the classroom

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To support TECC computer demonstration center activities, $127,200 was set aside from the total TECC budget for 1983-84 for the San Mateo Software Library and Clearinghouse to provide support to the TEC Centers. TECC staffs are trained in software evaluation, establishment of software evaluation training programs, and methods of integrating software into classroom instruction.

An additional $508,800 was set aside from the TECC budget for 1983-84 to support a math and science teacher retraining project to be coordinated out of Los Angeles County. This project coordinates college and university content training with TECC instructional methodology to facilitate retraining of math and science teachers.

Contents of the Report

This report presents the evaluation of the effectiveness of the TEC Centers, as required in SB 813, for 1983-84. Chapter II presents the methodology of the study, including evaluation issues and questions, the study design, and the instruments and procedures used. Chapter III summarizes the major findings and implications, including suggestions for support and resources needed to meet challenges.

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II. DESIGN AND METHODOLOGY

Overview

Education Code Section 44680.07 (SB 813) requires the Superintendent to submit an annual evaluation report on the TEC Centers to the State Board of Education, the Legislature, and the Governor. The evaluation is required to address "the effectiveness of the centers in providing, and assisting in, staff development." This report describes the major accomplishments and challenges of the TEC Centers at this time and suggests the types of additional support and resources that are needed for the centers to meet their challenges. It provides information on the status of staff development activities of the TEC Centers including the number and types of training and services provided. To some extent it also portrays variations between the TEC Centers in regional priorities and goals, staffing patterns, and major accomplishments. This evaluation was conducted by a team from the Special Studies and Evaluation Reports unit in the Program Evaluation and Research Division. Primary audiences for the evaluation are the State Board of Education, the Legislature, the Governor, the Superintendent and the SDE, and the TEC Centers.

Evaluation Design

Evaluation issues and questions were identified through discussions with TEC Center directors and with legislative and SDE staff. These issues cover four general areas: (1) the mission and resources of the TEC Centers; (2) services and training provided by the TEC Centers; (3) staff development strategies and models used by the TEC Centers; and (4) the TEC Centers as a regional staff development network.

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Issues Identified by Legislative Staff

Legislative staff expressed a strong interest in and support for the TEC Centers as a delivery system for staff development. There was a general acknowledgement that the TECC mission is both broad and bold, perhaps overly ambitious given the structure and level of funding of the TECC network. Legislative staff were interested in understanding more about the actual operation of the TEC Centers and in knowing what needs to be done to support accomplishment of the broad TECC mission. The major issues and questions generated by legislative staff are shown below.

Mission and Resources of the TEC Centers

The questions raised about the mission and resources of the TEC Centers were the following:

- How do different parts of the mission relate?
- What has happened to the original mission of providing regional support under AB 551 and other local staff development missions?
- Are resources adequate?
- How has the emphasis on computers taken away from the original mission?
- Why is so much time devoted to computers?
- Are demand and oversubscription of services leading to dilution?
- How can TECCs be involved in the curriculum reform movement?

Staff Development Strategies

The primary questions posed about staff development strategies were the following:

- Are TECCs doing enough under the requirements of AB 551?
- Is training of trainers the most efficient model?
- How can we provide for follow-up to training?

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- What is the impact of services?
- What is the quality of brokered services?
- Do teachers know about TECCs?
- What are the TECCs doing about teacher shortages?

TECCs as a Regional Staff Development Network

The major questions raised regarding TECCs as a regional staff development network were as follows:

- What is the authority of county superintendents?
- How is the SDE involved?
- Is the loose network without requirements working?
- Are there enough TECCs?
- How should the system be expanded?
- Should the distribution of money among the centers be changed?
- Does it make sense to have TECC regions organized around CSU?
- How can more involvement of IHEs be promoted?
- How can dissemination of successful efforts to other TECCs be promoted?
- Where are the successful instances of private sector support and how can they be promoted?

Issues Identified by TECC Directors

TECC directors were asked to identify the major issues that should be studied in depth for the evaluation. Below are some of the questions and issues suggested by the directors:

- What service delivery strategies have the greatest impact (e.g., mass training vs. capacity building)?
- What can be done to increase incentives for staff development and to promote LEA staff development plans?
- How can computers be better integrated with curriculum?

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- Should there be uniform needs assessments for all TECC regions?
- Should services be mostly planned or conducted in response to specific requests?
- What are successful strategies for developing partnerships with IHEs and private sector agencies? How much are TEC Centers doing this?
- How can TEC Centers collaborate with other staff development agencies?
- Are our clients being reached? How is the word getting out?
- How should we measure effects on participants?
- What variation exists among TECC regions in staffing patterns and types of training provided?

Evaluation Issues and Sample Areas of Inquiry

Based on a synthesis of issues identified through the interviews, the following general issues and sample areas of inquiry were identified:

1. The Mission and Resources of the TEC Centers
   - Analysis of SB 813, legislative intent and expectations
   - Local planning and needs sensing
   - Priorities and goals of individual centers
   - Staffing patterns and budget allocations
   - Role and activities of the TEC Centers in providing staff development resources in instructional methodology, mathematics, and science
   - Role and activities of the TEC Centers in providing assistance in site-based staff development programs
   - Role and activities of the TEC Centers in providing training in computers
   - Role and activities of the TEC Centers in relation to shortages of qualified teachers in certain curriculum areas

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2. Services and Training Provided by the TEC Centers

   - o Analysis and summary of data-based documentation of services and training
   - o Characterization of training in mathematics, science, other areas of the curriculum, computers, and instructional methodology
   - o Description of master calendars of individual centers and procedures used to publicize training and services
   - o Activities in support of AB 551 programs and other site-based staff development programs

3. Staff Development Strategies and Models Used by TEC Centers

   - o Policies and practices of individual centers in relation to scope and sequence of training
   - o Procedures and outcomes of local evaluation efforts
   - o Activities of the TEC Centers in developing state-of-the-art staff development models
   - o Relative emphasis on direct training and on capacity-building approaches, such as training of trainers and support of site-based staff development programs

4. The TEC Centers as a Regional Staff Development Network

   - o TEC Center activities in brokering and networking with other staff development resources
   - o Partnerships with IHEs, the private sector, and other staff development agencies
   - o Relationships among the 15 TEC Centers
   - o Statewide resources in support of the TEC Centers

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Sources of Information

Sources of information for the evaluation included site visits, interviews, a survey, document reviews, and an analysis of services and training reported by the TEC Centers. An overview of the sources of information for the evaluation is shown in Figure 2.2. The study team conducted one-day site visits to 11 of the 15 TEC Centers and the Software Clearinghouse which included personal interviews with center directors and other staff. Telephone interviews were conducted with the directors of the four centers not included in site visits and with five policy board chairpersons. Personal interviews were also conducted with SDE and legislative staff, staff of the Office of the Legislative Analyst, and staff of the Department of Finance.

Documentation of TEC Center training. The instrument used to document TEC Center training was streamlined from the instrument used by the TEC Centers to describe service delivery during their first year of implementation (1982-83). The original instrument included sections on teaching methodology and training workshops and on computer hardware and software. The sections on resource brokerage and capacity building were judged to be burdensome and unreliable and thus were deleted from the instrument in 1983-84. The sections on computer hardware and software were retained, but the information submitted by the centers for these sections was so incomplete and in such varied formats that the information could not be analyzed. Therefore, the documentation data presented in this report are limited to those submitted under the training activities of the TEC Centers. It should be noted that the documentation instrument continues to be a matter of concern to SDE and TECC staff. In its present form, the instrument is both cumbersome and open to interpretation in terms of how entries are classified. A committee of SDE and TECC staff are working during the summer of 1984 to improve the instrument.

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Figure 2.2

SOURCES OF INFORMATION

- Site Visits
  - One-day visits to 11 of the 15 TEC Centers and the Software Clearinghouse, including personal interviews with center directors and other staff
- Telephone Interviews
  - With directors of four centers not included in site visits and as follow-up to site visits
  - With five policy board chairpersons
- Interviews with SDE and Legislative Staff, Staff of the Office of the Legislative Analyst, and Staff of the Department of Finance
- Attendance at Meetings of TEC Center Directors
- Evaluation Survey
  - Math and science
  - AB 551
- Data Base Documentation of Services and Training
  - Number and type of training activities provided from February 1983 to February 1984
- Document Analysis
  - Master calendars and training announcements
  - Local and statewide planning and policy documents
  - Local evaluation studies

Teaching methodology and training workshops were defined as "organized workshops and formal training sessions which were routinely not adapted for particular audiences." For categorization ease, activities were subdivided by focus on curriculum, instruction, instructional supervision, school management, computer use, and other kinds of teaching practices. Content types were defined as follows:

- Curriculum ("what is being taught, with what instructional materials")
- Instruction ("how something is taught")
- Instructional supervision ("the observation and management of educational experiences by individuals")
- School management ("leadership and schoolwide problem-solving capabilities")
- Computer use ("instruction in computer technology")
- Other ("anything which doesn't fit into the first five categories")

Information presented in this report on number and types of training workshops provided by the TEC Centers is based on figures reported for the period February 1983 to February 1984. (See Appendix B for instructions on completing documentation forms for teaching methodology and training workshops.)

Interviews with TECC directors and staff. Interviews with TECC directors and staff were the most informative procedure used in this study in terms of providing a perspective on service delivery as well as the accomplishments and challenges of the TEC Centers. At the onset, the study team hoped to visit each of the 15 TEC Centers to conduct personal interviews with the directors. Due to time and travel constraints, four of the directors were interviewed by telephone using a shortened version of the personal interview guide. Personal interviews lasting up to four hours were conducted with directors of 11 of the TEC Centers. Where possible, personal interviews were also conducted with other TECC staff,

most often with staff responsible for computer training and for AB 551 programs. (See Appendix B for the interview guides.) An interview was also conducted with the Software Clearinghouse director and staff.

Interviews with policy board chairpersons. Telephone interviews of approximately 30 minutes each were held with five policy board chairpersons. The focus of these interviews was on governance issues, priority setting, and resource allocation.

Evaluation survey on math, science, and AB 551. A special evaluation survey was designed and sent to TECC directors in the spring of 1984 as an additional data collection activity. The purpose of the survey was to obtain information on the extent of TECC training and services in support of math, science, and AB 551. The curriculum portion of the training documentation instrument did not differentiate specific curriculum areas. Given the importance of math and science in the overall TECC mission, it seemed worthwhile to request information on these areas. The survey also provided an opportunity to obtain the perspectives of TECC directors on the need for their centers to provide more math and science staff development and on the activities of other staff development agencies in these areas.

Since the administration of AB 551 programs is now the responsibility of the TEC Centers, the SDE has relatively little information on the nature and effectiveness of site-level staff development programs supported by AB 551 grants. The portion of the survey on AB 551 inquired about the focus of local programs, the amount of TECC staff time devoted to AB 551, the impact of decentralized administration of AB 551, and the adequacy of current evaluation activities. (See Appendix C for the evaluation survey instrument.)

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III. MAJOR FINDINGS AND IMPLICATIONS

In this chapter the major findings from the evaluation study and their implications for the TECC program are presented. The organization of the chapter reflects the emphases of the study. First, an overview of TEC Center training activities during 1983-84 is provided, followed by major sections on computer training and math and science staff development. Next are sections on AB 551 and on TECC support services, including the software clearinghouse and retraining activities. These are followed by discussions on staff development strategies and delivery models and on organizational relationships involving the TEC Centers. Finally, a summary of major accomplishments and challenges of the TEC Centers is presented.

Overview of TEC Center Training, 1983-84

Most of the statistical information presented in this chapter pertains to the training activities of the centers. TECC directors were asked to describe each workshop (or course) by the level of the offering, the number and type of participants, and staffing arrangements. Training workshops and courses were broken down by course levels described as introductory (awareness level), advanced (application level), or training of trainers. Training was reported in the following six content areas: curriculum, instruction, instructional supervision, school management, computer use, and "other." These content areas were not discrete. In many cases, the content of courses overlapped categories. However, TEC Centers were requested to classify courses by their primary content.

Training in the Six Content Areas

During the year (February 1983 to February 1984), the TEC Centers reported offering a total of 2,466 courses representing a total of 28,711 training hours. There were a total of 68,726 reported participants in these training sessions.

Reported statistics on training within the six content areas are given in Tables 3.1 and 3.2. Note that the greatest portion of TECC training activity (nearly two-thirds) is devoted to computer use. Computer training is discussed in detail in the next section. The area of instruction accounts for the next largest portion (about 18 percent) of total TECC training activity in terms of total number of training hours. In contrast, the curriculum area accounts for approximately 10 percent of total training time.

There is considerable variation in intensity of training (i.e., length of courses) across content areas. Note in Table 3.2 that the average number of hours per course was 11.2 for computer use, 9.7 for curriculum, and 17.3 for instruction. Training in instructional supervision was by far the most intensive, averaging 24 hours per course, even though this area accounted for a relatively small portion of total TECC training activity.

Of the 292 total curriculum courses reportedly offered, approximately 70 percent were offered at an introductory level. These introductory courses lasted approximately 5.4 hours each. Approximately 24 percent were at an advanced level, averaging 19.8 hours per course. Six percent were labeled "training-of-trainers" and averaged 17.6 hours per course.

Much of the training effort within the curriculum area was devoted to math and science. These areas are discussed in detail in a later section of this chapter. However, in order to provide a flavor of some of the curriculum courses offered, we have listed in Table 3.3 titles of some of the more popular curriculum courses in terms of numbers of participants.

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Table 3.1

Summary of TEC Center Training, 1983-84

Training area	Number of workshops	Total number of sessions	Total number of hours	Total number of participants
Curriculum	292	665	2,839	9,047
Instruction	295	986	5,111	8,712
Instructional supervision	54	232	1,298	1,137
Management	142	237	1,095	3,652
Computer use	1,612	7,465	18,102	43,918
Other	69	80	264	2,222
Total*	2,466	9,666	28,711	68,726

*Totals may differ slightly from the sum of the columns due to missing classification information in the TEC Center documentation data base.

Table 3.2

Summary of TEC Center Training (Averages), 1983-84

Training area	Average number per workshop		
	Sessions	Hours	Participants
Curriculum	2.3	9.7	31.0
Instruction	3.3	17.3	29.5
Instructional supervision	4.3	24.0	21.1
Management	1.7	7.7	25.7
Computer use	4.6	11.2	27.2
Other	1.2	3.9	32.2
Total	3.9	11.7	27.9

Table 3.3

A Sample of TEC Center Curriculum Training, 1983-84

Selected titles	
Science Symposium	Holiday Art
Math Their Way	Latin America
Remedial Math	California Math Follow-up
Instrumental Enrichment Awareness	Spelling
Teaching Writing: A Practical Process	Project Wild
Aide Training	Project Earth
	Elementary Reading

TEC Center training activities in the other major content areas (instruction, instructional supervision, school management, and "other") were not studied in depth during this evaluation. The instruction and instructional supervision areas are extremely important parts of the overall TECC mission and a major carry-over from the PDPICs. The lack of in-depth information on these areas in this report in no way reflects on their importance as TEC Center staff development services. The recent resurgence of interest in improving the curriculum has called for increased staff development resources in the curriculum areas and for new staff development strategies that combine content and methodology training. Many TECC directors told us that they are currently re-examining some of their approaches to training in this light.

Variation Among the Centers in Training Provided

There is considerable variation among the 15 TEC Centers in the number and length of courses provided in each training area. In training in curriculum the median number of courses offered was 15, and the range was from 0 to 60. The average length of curriculum courses was 8.7 hours, with a range from 1 to 40 hours. Figures on the variation in training, by major area, are shown in Table 3.4.

One center provided all of its training in the computer area, stating that curriculum and instruction were adequately covered by other staff

development providers, especially in the county offices. Two other centers provided more training in instruction than in any other area, and one center divided its training activity approximately evenly among the areas of curriculum, instruction, and computer use. What is not yet known is whether the variation among the centers represents regional differences in staff development needs.

Table 3.4

Variation in Number and Length of Courses

	Number of courses		Course length, in hours	
	Median	Range	Median	Range
Curriculum	15	0-60	8.7	1-40
Instruction	13	0-87	18.7	5-29
Computer use	88	9-356	10.6	4-34

Computer Training

The TEC Centers, which began with a strong technical emphasis through former Governor Brown's Investment in People program, have continued to provide services and training dominated by computer-related offerings. In terms of total TEC Center training, total hours, and total number of participants, computer activity accounts for nearly two-thirds of the system output. The sheer numbers are impressive for a statewide system which was only beginning to organize itself in the fall of 1982: during the 1983-84 school year 1,612 training sessions were conducted consisting of 18,100 hours for 43,918 participants. There is no doubt that the TEC Centers have scored a major accomplishment in that they have made great progress toward bringing computer awareness and skills to California teachers. In addition to training activities all centers provide consultation in computer software and hardware and general

assistance to LEAs in instructional use of computers, including administration of AB 551 programs, the majority of which are computer-related. In this section we discuss the nature of the TEC Center computer offerings and present a discussion of a variety of issues related to future TEC Center computer activity.

TEC Center Training, 1983-84

Shown in Table 3.5 are the figures for TEC Center training broken down by introductory level, advanced level, and training-of-trainers. Close to 90 percent of the training was offered in computer awareness or introductory programming. While it might appear that the need for awareness and introductory training should soon decrease, the center directors see no such trend in the next few years. As one director told us, "Computer training demand was limited by the number of staff/trainers. We trained 2,500 teachers in a six-month period - we could double that number with more staff." In the short run at least, the sheer number of teachers, the propensity for teachers to repeat an awareness-level training, and the ever changing microcomputer industry are factors which will keep awareness-level demand high. However, a more appropriate role for the TEC Centers would be to devote more of their resources to higher level computer training, shifting some of the responsibility for awareness training to districts and other training cadres.

To provide a sense of the types of training offered by the centers, we present in Table 3.6 a sample of titles of TEC Center offerings in the computer area. The classification into the categories of awareness/introduction, applications, curriculum, programming, hardware/software, and other is our own and is devised to reflect the variety of offerings. Note that our assignment to a particular category was based on the title of the course and not on a content analysis. Furthermore, the number of entries in each category does not reflect

the distribution of offerings of all courses. Nonetheless, the table does accurately portray the range of computer training.

Table 3.5

TEC Center Computer Training, 1983-84

Training activity	Number of workshops	Total number of sessions	Total number of hours	Total number of participants
Computer (awareness) and introductory programming	1,408	6,253	15,155	37,972
Advanced programming and applications	168	1,062	2,193	5,101
Training-of-trainers	31	144	735	761
Total* computer use	1,612	7,465	18,102	43,918

*Totals may differ slightly from the sum of the columns due to missing classification information in the TEC Center documentation data base.

The clients for computer training include elementary teachers, secondary teachers, school administrators, classified personnel, and others such as county and district staff. Shown in Table 3.7 is a count of these types of clients. Participant data were not always collected, accounting for the large number in the "unknown" category.

The computer training was conducted by instructors from a variety of affiliations: 23 percent for the TEC Center staff; 15 percent from county office staff; 14 percent from district office staff; 19 percent from school staff; 13 percent from IHEs, and 16 percent representing other affiliations. These numbers demonstrate that the TEC Centers have built up a network of computer trainers within their regions. These cadres of trainers were established, trained, and nurtured by TEC Center staff computer specialists who are

dedicated full-time to computer activities. The computer area is unique in this "dedicated" staffing--there are generally no full-time specialists in the math and science areas, for example. The training-of-trainers activity is formalized in most TEC Center regions and, by virtue of the large numbers of training sessions, functioning reasonably well.

Table 3.6

Sample of TEC Center Computer Training, 1983-84

Awareness/ introduction	Applications	Curriculum	Programming	Hardware/ software	Other
Microcomputer Awareness	Word Processing	Microcomputers in Science	BASIC	CORVUS Presentation	Microcomputer Planning
Microcomputer Literacy	Electronic Spread Sheet	Mathematics Lab	PASCAL	Software Review	Microcomputer Staff Development
Introduction to Microcomputer	Multiplan	Microcomputer Reading Lab	Assembly Language	Computer Maintenance	Training-of-Trainers
Introduction to Apple	Personal File	Microcomputers in Social Studies	LOGO	Public Domain Software Selection	Telecommunications
Introduction to TRS-80	Data Base Management	Computer Spelling	Advanced Programming	Use MECC-Elementary	Information Processing
Computer Overview	Practical Uses of Microcomputer	Critical Thinking & Computers	Authoring Language	Use MECC-Secondary	

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Table 3.7

TEC Center Computer Trainees, 1983-84

Type	Number	Percent
Elementary teachers	9,658	22
Secondary teachers	8,780	20
Administrators	2,634	6
Classified	1,756	4
Other	7,902	18
Unknown	13,188	30
Total	43,918	100

Some Important Issues

While the TEC Centers have responded rapidly, professionally, and effectively to the challenge of providing training in the computer area, there are a number of issues which should be discussed as the centers enter their third year of training. With the additional mandates spelled out in SB 813 and a sizeable budget augmentation this year, there are strong competing alternatives to current offerings. The TEC Centers should consider carefully the future direction of their role in computer training vis-a-vis the overall mandate and expectations for the centers. Some of the issues are discussed below:

1. Integration of computers into the curriculum. The use of computers to improve instruction and learning within a discipline is essential if computers are to make a contribution to education. Most of the TEC Center directors are moving in that direction but too little progress is being made. One center director told us that "The demand for integrated training is starting but teachers don't know the questions to ask." Other directors believe that the demand for awareness-level

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training is so great that too many of their resources must go to meet that need. One significant impediment to more integrated training is the lack of quality software across all curriculum areas. There are, however, SDE and legislative efforts to ameliorate this situation by encouraging software development through grants, working with publishers to encourage better software, and making available large public domain software collections.

The TEC Centers are in a unique position to take an active role, both collectively as a network and individually within their regions, to develop a strategy to encourage local development of software (through AB 551 grants or mini-grants, for example) across all curriculum areas and to build trainings around these integrated packages.

2. Too much computer training? As we have noted elsewhere in this report there is a legislative expectation that the TEC Centers engage in a broadly-based program of staff development for classroom teachers and school staff. As outlined in SB 813, computer training is but one of three primary charges to the TEC Centers (the other two are training to support curriculum and instruction and assistance in site-based staff development), yet the centers currently offer two-thirds of their training in the computer area. There are several reasons why this is so, not the least of which is client demand. Small computers are still new and highly visible and rewarding for the TEC Centers, and they have performed admirably. However, the pressure to impact on instruction by improving staff development in all areas should cause some re-thinking about the level of effort expended in the computer area, particularly given the rather modest resources of the TEC Centers.

Notwithstanding the need to adjust priorities to address other areas of responsibility, some changing directions may be in order. Among them are the following:

- o Begin to shift the introductory and awareness level training to the districts as local capacity building takes hold.
- o Increase the focus on training-of-trainers models and other delivery systems which support capacity building.
- o Focus on the integration of computers into the curriculum as described above.
- o Begin to focus on higher level and specialized training.

3. Development of a strategic plan for TEC Center involvement in technology. As the showcase for computer activity in California education, the TEC Centers should continue to be state of the art in hardware, software, and training. In order to remain at the forefront of technology training, the TEC Centers should no longer have awareness training as their predominant offering in the computer area. The development of a plan would be the beginning of a process to sift out the priorities in the computer area and to balance these with other staff development priorities.

Math and Science

Presented in this section is an analysis of the math and science staff development activities conducted by the TEC Centers. Included are discussions of: (1) the dimensions of math and science training; (2) the extent and nature of TECC math and science training; (3) some explanations for the limited activity in these areas; and (4) suggestions for increasing math and science staff development.

The TEC Centers are mandated by SB 813 to provide staff development resources "in all areas of the curriculum, but especially in mathematics, science, technology, and other curriculum areas. . . ." Prior to SB 813, the Budget Act of 1982 charged the TEC Centers to allocate 60 percent of their resources to math and science staff development. With these charges it would be reasonable to expect a substantial amount of TECC training in math and science. What we found, however, was that the TEC Centers provide very little training in math and even less in science. Even more striking is the lack of demand for training in these areas. As one TEC Center director reported to us, "Traditional staff development methods are not sufficient to attract practicing math and science teachers. Incentives are needed in the form of release time, stipends, and other creative and motivational programs if we are to truly impact the quality of math and science instruction in our schools." Later in this section we will develop some themes which lend a perspective on math and science activity, and we will suggest some potential actions for increasing TEC Center activity in math and science.

The Dimensions of Math and Science Training

There are basically three groups of secondary teachers for whom math and science staff development should be provided: the "crossover" teachers who have minimal formal training in math or science; current math and science teachers who are inadequately trained in their content area; and adequately prepared teachers who need "retooling" in their content area. Each of these groups required a different training approach varying in intensity from a half-day workshop to a year or more of structured training.

A recent study[2] commissioned by the San Diego TEC Center sheds some light on the scope of the shortage of qualified teachers in mathematics. From

[2] Silver, Edward A. The Mathematics Teacher Shortage: An Analysis of the Problem and Some Possible Solutions. A Report to the Policy Board of TEC Center for San Diego and Imperial Counties. October, 1983.

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a survey of all secondary teachers in the region (the response rate was about 20 percent), Silver concludes that "In general, the data suggest that the current group of mathematics teachers in our region is drastically underqualified. Nearly 50 percent of the current teachers appear to lack the minimum qualifications for teachers of junior high school mathematics established by the National Council of Teachers of Mathematics, and almost 80 percent lack the minimum qualifications for teachers of secondary school mathematics." Shown in Table 3.8, from Silver's study, is rather cogent evidence that there is need for substantial improvement in content training--47 percent of the teachers responding to his survey have less than a math minor.

Table 3.8

Classification of a Sample of Teachers,
by Mathematics Background
(from Silver, 1983)

Mathematics background	Number of teachers (percent)	
Master's Degree	19	(8%)
Bachelor's Degree	31	(13%)
Math Minor	71	(31%)
Less than Math Minor	109	(47%)
Not Reported	1	(1%)

The role of the TEC Centers as providers of training in this picture is less clear. They are but one, and a rather modest (in terms of resources), contributor to the solution of a problem that requires intervention on numerous fronts. It is evident that the centers cannot provide the kind of massive retraining necessary to dramatically improve the situation. They can, however, continue in the tradition of the School Resource Centers and PDPICs and provide professional development or "retooling." (A discussion of retraining in math and science is covered in a separate section of this chapter on retraining.)

Elementary teachers represent a largely untapped market for TEC Center training in math and science. The demands for content are less stringent and methodology is particularly important. While the need is overwhelming, the TEC Centers certainly can contribute meaningful staff development in math and science for elementary teachers.

The Extent and Nature of Math and Science Training

Shown in Table 3.9 is a statewide summary of the number of math and science workshops, the total hours of training included in the workshops, and the total number of participants who were trained by the TEC Centers. These figures were compiled from the evaluation survey. Note that these figures are in conflict with data from the data base documentation instrument reported in Table 3.1, where the total curriculum training was 292, which is less than combined math and science figures (303) in this table. This discrepancy points to a need to develop a more reliable documentation system.

Table 3.9

TEC Center Math and Science Training, 1983-84

	Math	Science
Courses	181	122
Hours	2,040	826
Participants	3,013	2,881

Between February 1983 and February 1984, the TEC Centers conducted an average of 8.5 math workshops representing an average of 130 hours of math training. The median number of individuals participating in math training at each center was 140.

During the same period of time, the TEC Centers conducted an average of six science workshops representing an average of 27 hours of science training.

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The median number of individuals participating in science training at each center was 84.

These numbers are in contrast to the large number of training workshops in the computer area (see Table 3.5). In our interviews with TEC Center directors, estimates of math workshops as a percentage of total workshops hovered around 5 percent to 10 percent of total TEC Center training; in science the figure was closer to 5 percent, or less. The TEC Center directors feel that more staff development in both math and science is needed. In response to our mail survey, 11 out of 14 directors said that there is a need for their centers to provide more staff development in math than is currently offered. All 14 directors responding to the survey said that there is a need for their centers to provide more science staff development.

Training workshops specifically identified as math or science tend to be mixtures of content and teaching methodology. To provide a sense of the nature of the math and science training, we have listed in Table 3.10 the titles of a statewide sample of TEC Center-sponsored activities in math and science. While this is only a surface view (and subject to interpretation vis-a-vis content), this list nonetheless conveys a flavor of the offerings.

Particularly impressive is the math and science approach in one large metropolitan area TEC Center. Briefly, the TEC Center director, with the approval of the policy board, wrote requests for proposals (RFPs) to fund the development of training programs in math and science. The RFPs were distributed to the IHEs in the TEC Center service area and were designed to generate cooperative relationships, drawing on the content expertise of the IHEs and the methodology expertise of the TEC Center staff. The resulting programs are four-day workshops targeted at the regular and/or reassigned math or science teachers. In the case of the math program, the training was designed and is

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being run with the cooperation of the local California Math Project. University credit is given for both the math and science programs and follow-up is planned by TEC Center staff at the school site level. While the actual number of teachers trained by these two programs is not yet great, we see this as an example of what the TEC Centers do well: they assume the role of coordinator and combine resources among various institutions (TECC, county, IHEs, districts, and schools).

Table 3.10

A Sample of TECC Math and Science Trainings

Selected titles
Science Fair
Science: Curriculum Development
Math Manipulatives: Their Use in Classrooms
Science on a Shoe-String
Computers in the Math Curriculum
Learning Theory Research in Math and Science
Advances in Biology: Molecular Biology and Recombinant DNA Technology
Principles and Theories of Evolution in the Physical, Earth, and Life Sciences
Mathematics Their Way
Earthquake Preparedness: A Hands-on Workshop
Math in the Junior/Senior High School
Science Institute Follow-Up
Developing Children's Thinking through Science
Math Improvement
Math Enrichment Modules
Genetic Engineering--A Revolution in Biology

Agencies Conducting Math and Science Training

While the TEC Centers have been given a specific legislative charge to conduct staff development in math and science, they are but one of several interrelated agencies providing math and science support. Shown in Table 3.11 are the results from our mail questionnaire, in which we asked the question, "Which agencies within your region conduct staff development in math/science,

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and approximately what percent of the total activity does each agency conduct?" The percentage represented by the TEC Centers represents their direct contribution; however, they are often involved in the brokering of math and science services through all of the other listed agencies.

Table 3.11

Percent of Total Math and Science Staff Development Activities Conducted by Various Agencies

Agency	Staff development activities			
	Math		Science	
	Percent[a]	Number[b]	Percent[a]	Number[b]
TECC	25	13	30	11
County offices of education	20	11	20	12
Districts	22	8	23	8
IHEs	18	7	5	5
Lawrence Hall of Science	26	2	—	—

[a]Percentage figures reported are medians and do not sum to 100 percent. A given percent represents the proportion of total math/science activity a particular agency conducts.

[b]"Number" refers to the number of TECCs that reported a particular agency's involvement in math/science.

Not unexpectedly, county offices of education play a predominant role in math and science training. This reflects the historical role of the counties in working with districts to provide training in the curriculum areas. Typically, county offices are staffed with curriculum experts (most counties have math specialists, but only about 20 percent currently have science specialists) who either provide training directly to districts or broker services. In contrast, the TEC Centers are typically not staffed with either math or science specialists (along with general staff development professionals TEC Centers

usually have only one specialist--in the computer area) and broker nearly all of the content training or cooperatively sponsor training, with the TEC Center providing the methodology component.

District offices also account for a fair share of math and science training. Medium to large districts are staffed in a manner similar to county offices in that they often have math and science specialists to serve the schools in their region. Again, TEC Centers are often in the role of brokering district curriculum services.

IHEs vary from region to region in their contribution to math and science training. In most areas where a California Math Project is funded, TEC Centers are cooperatively and generally actively involved with their local project. This involvement can take several forms: (1) the TEC Center advertises trainings and the California Math Project provides the trainers; (2) the TEC Center provides the computer equipment both for the summer institute and for training throughout the year; (3) the TEC Center cooperatively provides training and methodology expertise; (4) the TEC Center provides financial support to the California Math Project. By and large, the TEC Center directors are pleased with the projects and cite them as their primary involvement with math training. Indeed, in most TECC regions the developmental work occurring in math is conducted under the joint auspices of the California Math Project and the TEC Centers.

The involvement of IHEs in science staff development is considerably less developed than in math, primarily due to the fact that as yet there is no established analog of the California Math Project. Only one TEC Center reported any significant activity with a local university, although two San Francisco Bay Area TEC Centers reported significant support from the Lawrence Hall of Science.

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The SDE, through its Science Education Unit, made available to the TEC Centers 13 workshops in science education. The list of workshops included the traditional disciplines, such as biology, chemistry, physics, and earth science. Other workshops offered were elementary science teaching, laboratory safety, science fairs, and integration of mathematics and science. These offerings were intended to give the TEC Centers some popular and respected workshops in specialized science content areas. Given the TECC mandate to provide staff development in science, these workshops were suggested in an attempt to be responsive to this need by quickly making available some quality science content training. According to the manager of the SDE Science Education Unit, the response from the TEC Centers was varied--some centers presented most of the workshops, but most of the TEC Centers showed little enthusiasm. While these science course offerings were never intended to provide the full range of science staff development, they are nonetheless the only concrete product offered directly to the TECCs. It is somewhat surprising, then, that the TECCs reacted more or less apathetically to the workshops. The TECC directors offered several reasons for this, some of which point to the need for a more cooperative relationship (between the centers and the SDE) in approaching the overall problem of comprehensive staff development in science:

1. The TEC Center directors feel that they should have been involved in the planning of SDE-sponsored training rather than handed the workshops in a "top-down" fashion.
2. The SDE workshops were not funded, and the TEC Centers had to pick up the cost.
3. Most TEC Centers are interested in the integration of computers with science. Such workshops would guarantee a large turnout and "capture" science teachers for additional training.

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4. The TEC Centers are looking for comprehensive staff development activities and were not satisfied with the SDE-offered "one-shot" training workshops and "clearly know how to do them without SDE help" (even though most of TECC training is "one-shot" and TECCs are doing very little in science training).

We believe that the goals of the TECCs and the SDE are congruent with respect to a comprehensive staff development process and that much progress can be made in the next year or two by involving the TECCs directly in both the planning and delivery of science staff development.

Why Not More Training in Math and Science?

One of the most striking findings is the relatively low level of activity in math and science training, not only from TEC Centers but from other education agencies as well. This finding emerges against a backdrop of shortages of teachers and legislation directed to stimulate teacher training and production in these areas. The extent of the shortages varies across the 15 TEC Center regions. A preliminary study of the shortage problem conducted by the SDE reinforces the uneven nature of the shortage. The study, The Teacher Shortage in California: A Preliminary Analysis, states in part ". . . some areas will experience sharp declines while others will show sharp increases in 9-12 enrollments. These shifts, changes in enrollment, recently dated graduation requirements with their associated staffing needs, projected retirees and new teacher demands within subject areas, will combine to provide a complex staffing problem for secondary schools over the next ten years." The statewide picture is not yet known, but the results of an SDE statewide survey of districts ("Survey of Teacher Demand and Shortage, 1983-84," March 1984) should yield estimates of teacher shortages in all curriculum areas. The results of this survey should prove useful for both the SDE and the TEC Centers in planning efforts in the coming years.

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In the evaluation survey we asked directors why their centers currently are offering less math and science staff development than is needed. To account for why their centers are providing less math staff development than is needed, out of 14 directors:

- o Nine cited insufficient resources.
- o Five cited lack of client demand.
- o Five cited higher priority in other areas.
- o Eight cited insufficient time to develop a plan for math staff development.
- o Six cited lack of qualified trainers.

To account for why their centers are providing less science staff development than is needed, out of 14 directors:

- o Twelve cited insufficient resources.
- o Nine cited lack of qualified trainers.
- o Seven cited insufficient time to develop a plan for science staff development.
- o Seven cited higher priority in other areas.
- o Five cited lack of client demand.

Based on data from a variety of sources (primarily TEC Center director interviews and survey results), there appear to be several somewhat interrelated reasons that the TEC Centers are providing less staff development in math and science than is needed:

1. Lack of client demand. As we mentioned earlier in this section, teachers are not rushing to be trained in either math or science. Elementary teachers are generally not strong in math and science and often avoid additional training. Secondary teachers, on the other hand, tend to identify with their specialties, are relatively

uninterested in teaching methodology, and look to their professional organizations (in science, to the National Science Foundation) for content training. Two comments from our survey best express the lack of demand: "Although this area received highest rating from district administrators in our most recent needs survey, very few teachers come to programs offered by TECC and counties"; and "Data would indicate a need for additional inservice; however, teachers are not responding in significant numbers. The need may be apparent, but the motivation for people to attend is not."

2. Higher priority in other areas. TEC Centers are besieged with requests for training in computers, instructional supervision, and methodology which easily occupy their somewhat limited staff. It is natural for the TEC Centers to do what's in high demand (i.e., computers), what they do well, and what is widely perceived as their only mission. The demand for computer staff development is, in the short run, inexhaustible--what time is left for other areas of staff development is a function of the strength of the individual TEC Center, which is typically not math and science.

3. Lack of qualified trainers. Although a problem for both math and science, it is particularly acute in science. In math there is the support of the California Math Project and a limited training cadre in math who can instruct across a broad spectrum of the discipline. In science there is no support analogous to the California Math Project; and science training, as such, is not offered. There are few trained specialists available to offer staff development in the many disciplines of science such as physics, chemistry, and biology.

4. Lack of resources. Reasons 2 and 3 are clearly subsets of this reason. Comments from two directors highlight the need: "The expectation that a certified staff of approximately four FTE can serve the staff development needs of educators in 11 counties with an a.d.a. of 240,000 pupils in teaching methodologies, supervision skills, computer use, math and science is somewhat unrealistic. More resources are necessary to adequately meet the staff development needs of so many in such a large and diverse region"; and "Some TECCs are located in county offices that have specialists in math/science. This TECC has no such resource and must rely on internal staff or on district/school staff members."

5. Insufficient time to develop a plan. Some TEC Centers, in this second year of operation, are beginning to develop plans for math and science training. One TEC Center director commented, echoing the theme developed above, "A written science staff development plan has just been completed. A math staff development plan must now be done. Higher priority has been given to computer literacy simply because of the overwhelming number of teachers who have requested it." Eight of the TEC Center directors reported to us that they have not yet developed a training plan for math and science. Another TEC Center director added, "Math and science needs an in-depth, well thought out plan with follow-up."

Suggestions for Increasing Math and Science Staff Development

There is no simple solution to the math and science training problem. It is a complex situation whose boundaries are not well defined and no single act is likely to significantly alter the picture. We believe, however, that good, solid incremental improvements are possible by instigating change on a

number of fronts. Our recommendations emanate from our belief that the TEC Centers can serve as one "umbrella" agency for math and science training (at least the "retooling" portion). It is especially important that any TEC Center action should be coupled with a program of incentives to districts and schools to create a professional climate of expectations for teachers in math and science.

Following are actions that the TEC Centers and the SDE could follow and which we believe would enable the TEC Centers to provide additional training in math and science:

1. Use some of the increased allocation from the 1984-85 Budget Act to hire math and science specialists in each TEC Center. These specialists would be in a unique position to provide direct services: broker training; coordinate with schools, districts, counties, and the state; and work cooperatively with other TEC Center personnel to provide quality staff development.
2. Coordinate the development of a "training-of-trainers" model backed by sufficient state resources, support, and interest.
3. Establish statewide clearinghouses or special centers for math and science. The purposes of the clearinghouses would be: (a) to provide a centralized resource for exemplary math and science staff development projects; and (b) to house a collection of math and science curricular materials.
4. Continue to create leverage for the TEC Centers to work with districts, IHEs, and business and industry. An example of an area where agencies are mandated to work with the TEC Centers is the California Math Project.

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5. The SDE, through the Staff Development Unit (SDU) and the Office of Mathematics, Sciences, Technology, and Professional Development, should play a stronger leadership role. Probably the most important areas involve working with the TEC Centers in the development of a strategic plan for math and science training and coordinating statewide training needs with local needs. The SDE could also provide regional training sessions for TEC Center personnel in areas such as current legislation; linkage to state level resources such as curriculum frameworks; specialized math and science content topics; in-service training models that will work in different types of districts; and so on.
6. Provide a variety of incentives for districts and teachers to encourage staff development in math and science. Since, as one TEC Center director reported to us, "many districts do not allow release time for intensive staff development in math and science," ways need to be found to strongly encourage or reward districts and teachers who participate in training.

AB 551 School Staff Development Programs

This section includes a description and analysis of the role of the TEC Centers in administering and providing technical assistance to school site staff development programs funded under AB 551. It is not presented as an evaluation of the AB 551 program per se but rather as a look at the TECC regional staff development delivery system in administering AB 551 grants.

Background

The AB 551 legislation was enacted in 1977 (Chapter 966). It was based on the belief that effective, ongoing staff development is necessary for the continued vitality of the public school system. The intent of AB 551 is to

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give all those who work with students ongoing opportunities to improve instructional, counseling, and human development skills through locally designed staff development programs. Article 1 of AB 551 authorizes school districts, with the participation of local school personnel, to establish school-level staff development programs. Article 2 of AB 551 funded the School Resource Centers, which were charged with, among other things, providing technical assistance to schools receiving AB 551 grants. The responsibility for reviewing grant applications, making grant awards, and monitoring funded programs was originally given to the SDE.

The Budget Act of 1982-83 transferred to the TEC Centers all responsibility for AB 551 that was originally held by the School Resource Centers. In addition, responsibility for evaluating applications, awarding grants, and monitoring local programs was transferred from the SDE to the TEC Centers. The effect of this shift was to decentralize the administration of AB 551 programs from the state level to the regional level. The SDE currently is responsible for setting AB 551 policies and for adjusting and processing all local assistance monies for the program.

The 1982-83 Budget Act stipulated that AB 551 grants should be awarded primarily to local programs that are designed to improve instructional skills in math, science, use of computers, and other areas of the curriculum in grades seven through twelve. Program goals for 1983-84 were similar, with an emphasis on upgrading math and science curriculum and other areas in which there are teacher shortages.

Applications for AB 551 funds must be based on a district-supported, school-level staff development plan prepared primarily by classroom teachers and encompassing a three-year training program. Funds may be used for teacher training (including training for substitutes), fees, and travel for training or

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for visits to exemplary programs, stipends for summer training, and the purchase of materials. Up to 25 percent of the funds may be used for math, science, and computer materials and equipment.

AB 551 grants are based on units of average daily attendance (a.d.a.). The level is currently set at $4.62 per unit of a.d.a. for elementary schools and $7.00 per unit of a.d.a. for secondary schools. Recipients of new AB 551 grants are announced in April of each year. Because of the a.d.a.-based funding formula, the successful applicants do not receive their grant monies until April of the following year (after the first principal apportionment). Counties vary in their willingness to release funds to grantees after receiving the announcement of grant awards from the SDE.

Current Funding Patterns

The total state allocation of AB 551 monies for 1983-84 was $3,353,902. Six-hundred thirty-six schools located throughout the state were granted AB 551 monies for 1983-84. Of these, 179 were elementary schools and 457 were secondary schools. Grants ranged from $25 for a school with 3.55 a.d.a. to $25,868 for a school with 3,695 a.d.a. The average grant amount was $5,273.

In the TECC evaluation survey we asked TECC directors to report the percent of AB 551 programs emphasizing each of several content areas. Most (77.5 percent) AB 551 programs are currently devoted to computer staff development. Our interviews with TECC directors corroborated this finding, suggesting that there is a strong computer theme in many projects that were not listed as primarily devoted to computer staff development. In short, AB 551 monies currently represent a significant source of funding for computer staff development.

TEC Center Support for AB 551

The major activities of the TEC Centers in relation to AB 551 programs at this time are: (1) providing assistance to schools in preparing staff

development plans and writing grant proposals; and (2) assisting policy boards in the review of applications and selection of grant recipients. TECC staff also provide technical assistance to funded projects in implementing their staff development plans, but we encountered wide variation among the centers in the extent to which this technical assistance is given high priority. While a few centers devote considerable effort to assisting and monitoring local programs, other centers have only a nominal role once the grants are awarded. Overall, the TEC Centers reported an average of 0.33 FTE staff time devoted to AB 551. The range was from 0.1 FTE to 1.3 FTEs.

Some Issues Pertaining to AB 551

In 1983-84 the monies for AB 551 were struck from the budget by the Governor, then restored to the level of the 1982-83 allocation due to the wide support for the program by TEC Centers, counties, districts, and schools. In our interviews with TECC staff we found overwhelming acclamation for the program. This expression of support for AB 551 was especially striking from those TECC directors who conceded that they devote relatively little staff time to AB 551. AB 551 is currently one of the few incentive programs for staff development at the site level. Although site-level planning for staff development is a major feature of the School Improvement Program (SIP), AB 551, as a special grant program, has the added benefits of both a prestige factor and monies (however small the amount) targeted specifically for staff development planned by teachers. We heard from numerous TECC staff that AB 551 is structured to capture much of the essence of good staff development. Several TEC Centers have established other grant programs modeled in part after AB 551. (See also the section on "Staff Development Strategies and Delivery Models.")

AB 551 is currently the major "capacity-building" activity of the TEC Centers. In the judgment of many people interviewed during this study (both

TECC staff and legislative staff), the goal of empowering LEAs to plan and implement their own staff development programs is at the core of the TECC mission, being far more challenging yet in the long run more powerful than providing training workshops.

In the evaluation survey we inquired of TECC directors about the impact of decentralization of AB 551 administration on their work load and on overall program effectiveness. Directors felt that the program has benefited from decentralization even though the TEC Center work load has increased considerably. The following comment captures the typical response: "It has been a tremendous impact on our work load, but the 551 funds have created a great deal of excitement locally in our region. Schools greatly appreciate direct service by the TEC Center during the complete process of application, implementation, and evaluation. The support has led to more effective programs in the schools." Some directors said that the work load is so great that they are unable to provide as much technical assistance as they should. This concern is expressed in the following comment: "It (decentralization) has encouraged TECC staff to become much more involved in individual site planning. This enhances the TECC's ability to spot needs and to plan for regional priorities. It also promotes regional networking. The work load is heavy, and we are frustrated that we cannot allocate the time required to do what should be done to support the schools."

A number of the directors voiced dissatisfaction over receiving no funds targeted for administration of AB 551. A portion of a center's overall budget can of course be earmarked for AB 551 even though there is no specific appropriation for this purpose. The lack of administrative monies to offset costs and the heavy overall work load for the TEC Centers are two factors which help explain the relatively small amount of time devoted to AB 551 in many (though

not all) of the TEC Centers. It may also be that most funded projects do not require much in the way of monitoring or technical assistance once the grant application and the proposed staff development plan have been completed. Since grants tend to be relatively small and to be used for computer-related staff development, there may be little need for close supervision. We were told that, not surprisingly, the AB 551 schools are a significant source of clients for TECC-sponsored workshops, primarily in the computer-use category.

As a result of recent SDE policy, TEC Centers are currently prohibited from approving AB 551 grants to schools that are receiving SIP funds unless the funds are used at different grade levels. Because most of the SIP schools are elementary schools, the effect of this policy may be to make AB 551 almost exclusively a secondary school program. Other SDE policy issues of concern to TECC directors include funding equity: should there be a floor and ceiling in grant amounts? Since funding is based on a.d.a., small schools may receive such small grants that it is absurd or unreasonable to expect a staff development plan. Conversely, large schools may receive a disproportionate amount of money for program planning and implementation.

The timing of the actual receipt of program funds by grantee schools is another concern of the TECC directors. Due to delays in AB 551 appropriations this year, some programs were not able to start until mid-year.

Concern was expressed by TECC directors that too little is known about the implementation and impact of AB 551 programs. As one director remarked, "The current AB 551 evaluation activiites are minimal at best." On the other hand, some directors observed, and we agree, that the evaluation burden on grantee schools should not be increased since most grants are quite small. We would expect that increased contact between the TEC Centers and AB 551

schools within their regions would improve the quality of programs. We concur with the director who commented:

> Evaluations of AB 551 activities are inadequate. However, no greater evaluation burden should be placed on the recipient schools. Any additional evaluation must be absorbed by SDE or TECC. Many AB 551 schools receive so little funding that it is impractical to ask them to invest substantial time or resources in evaluation activities. All too often we require/request evaluations that are disproportionate to the resources allocated for programs.

We recommend that the SDE and the TECC directors jointly develop a plan for reviewing local program evaluation procedures and that the SDE assume responsibility for designing an evaluation of the AB 551 program as a whole during the next year.

At best, AB 551 grants could be the impetus for stimulating a commitment to staff development at the school level, for launching a planning process that might extend beyond the funding cycle, and for providing some modest resources as seed money to begin implementing local plans. At this point, we know relatively little about how the programs actually work and virtually nothing about any "sustained effects" of AB 551 programs. We encountered almost universal endorsement of AB 551 because it has built into it many of the elements of what is generally regarded as good staff development--i.e., it is an incentive program for staff development at the site level based on a plan developed primarily by teachers. Given the modest funding level for the total program, perhaps it is enough that it contains these elements, and perhaps it is too ambitious to expect measurable and lasting changes in teacher competencies. On the other hand, as one of the few incentive programs for local staff development, it is important that AB 551 be a model for what staff development can be. We feel that the program would benefit from a carefully designed study that would examine, among other things, the overwhelming current emphasis on computer staff development and assessments by teachers, administrators, and local governing boards of program effectiveness.

TECC Support Services

SB 813 sets forth a role for the Superintendent of Public Instruction in providing a variety of programs and services to support the staff development activities of the TEC Centers. At the present time the two support services which are funded out of the total TEC Center allocation are an educational software library and clearinghouse and a teacher retraining project. This section contains a description and analysis of each of these services.

To support TECC computer demonstration center activities, $127,200 was set aside from the total TECC budget for 1983-84 for a software clearinghouse to secure and evaluate existing software. An additional $508,800 was set aside for 1983-84 to support a math and science retraining project.

The Software Library and Clearinghouse

SB 813 codified the provision for an educational software library and clearinghouse to assist the TEC Centers with software evaluation. However, the need for a statewide effort for software evaluation was identified and funded by the 1982-83 Budget Act. The SMERC Library Computer Center in the San Mateo County Office of Education was designated the statewide TECC Software Library and Clearinghouse (SLC) by the SDE.

During 1982-83, the SLC accomplished the following tasks: (1) the training of TEC Center staff as software evaluation specialists to train teachers in their regions as software evaluators; (2) construction of a resource list of favorably reviewed software, called the 1983 Educational Software Preview Guide; (3) the provision of rotating collections of public and private domain software for preview and evaluation at each TEC Center; and (4) the collection and dissemination of critical evaluations of instructional software for TEC Center use. The SLC promoted software evaluation in a number of additional ways. For example, an index to journal reviews of instructional software was created as

well as a standardized software evaluation form assessing the technical quality of instructional software for use by the TEC Centers.

The scope of work for the SLC for 1983-84 reflected a refined and expanded version of the original goals and accomplishments: (1) provide TEC Centers and SDE with both rotating and permanent collections of instructional and management software; (2) assist TEC Centers to establish an electronic network for easy access to software evaluations; (3) develop a non-technical software evaluation form(s) for teachers unfamiliar with microcomputers; (4) coordinate a Software Forum for TECC staff, with emphasis on evaluating the integration of software into classroom curriculum; (5) update the index to journal reviews; and (6) coordinate another Spring Forum for software review and TECC staff input for future planning activities.

The SLC has changed its emphasis from the technical review of educational software to evaluation of the integration of software with curricular/content areas. For example, the SLC co-sponsored workshops for special education teachers to adapt the evaluation form to special education needs.

The SLC is continuing to use the "training-of-trainers" model to give TEC Center staff the ability to do their own software evaluation training. The vehicle for this training, the yearly Software Evaluation Forum, is considered by the TEC Centers to be one of the most valuable SLC services. Ninety-one TEC Center staff attended the Forum in January. Another service, the Educational Software Preview Guide, also an outcome of the Forum, provides published indexes of good software, with particular reference to use in the classroom.

Although the SLC services the second year included software evaluation training, they were spread more thinly than in the prior year. The SLC functioned as a liaison between the TECCs and the software publishers to encourage

high standards for educational software, to develop use policies (especially with regard to the copyright issues), to promote integration of software with curriculum, and to identify "gaps" in classroom software needs and commercial supply. The SLC also functioned as a liaison with other education organizations on a national level to further its information network.

SLC staff believe that the future success of their service will be based on the TEC Centers' ability to coordinate or "share" educational software. More schools are requesting software in specific subject areas, thus making the rotating collections of SLC software more important. Software must be circulated from one TEC Center to another so that not all TEC Centers need to buy all the software. Commercial software is expensive, and the funds for software purchase are limited.

The SLC has not yet been able to establish an intra-TECC electronics network to promote a "faster turn-around" of evaluation information.

Teacher Retraining

The retraining of teachers is a statewide problem of immense, although not clearly defined, proportions requiring action throughout all levels of the educational system. There is a need for a well-defined, well-funded, multiple-level, coordinated effort among key agencies, including the Legislature, the State Department of Education, the Commission for Teacher Credentialing, institutes of higher education, counties, districts and schools, teacher organizations, the TEC Centers, and others. To provide some perspective on the role of the TEC Centers in retraining, consider that in 1982-83 a state grant of $480,000 was made to the Los Angeles County Office (coordinated through the L.A. TEC Center) to administer the Math Retraining Project with regional colleges and universities (subsequently reallocated in 1983-84 at $508,000 for math and science retraining). While the program trained approximately 140 teachers for

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one year, this was (and remains) the only formal retraining program involving the TEC Center system. This retraining program was specifically targeted for Los Angeles where there are large numbers of math and science teachers who are teaching under emergency authorizations.

As we have described elsewhere in this report, the TEC Centers are moderately staffed (approximately 4 FTEs per center) and well situated to provide professional staff development services in curriculum, instructional supervision, school management, and computer use. Given their mission, level of resources, and overwhelming demand for services in some areas, it may be unrealistic to expect a meaningful contribution in the area of teacher retraining. In other words, the TEC Centers are currently not constituted in such a way as to intervene significantly in the retraining area.

The TEC Centers, however, can and do play a role in the professional development or "retooling" of currently qualified teachers. With the education reform movement underway and the persistent and often dramatic impact of technology on all phases of the curriculum, even the most qualified teachers can benefit from periodic updates in both content and pedagogy.

We did not, as part of this evaluation, look closely into the Math and Science Retraining Program. The SDE's Staff Development Unit, however, has summarized the program's operation during 1982-83 and what follows is the presentation of its analysis. We note that the problem areas which are presented in the analysis are addressed in the Request for Proposals for the 1984-86 Math and Science Teacher Retraining Program.

In 1982-83, the Math Retraining Project funded four college and university programs in the Los Angeles area to train approximately 200 teachers with varied mathematics backgrounds and in need of differing mathematics training and credentials. The program was designed to provide: (1) math content courses

sufficient for teachers to pass the National Teacher Examination in mathematics to partially qualify for an additional authorization or math content courses and unit credits necessary for teachers to qualify for a supplemental authorization in math; and (2) math methodology courses or workshops within a supportive environment for teachers.

Data from the formative evaluation of the program indicate that approximately 140 of the 200 initial participants completed the first year of training (an attrition rate of 30 percent). These persons were selected from the pool of 800 applicants on the basis of their current credentials, the urgency of their need, and their math backgrounds. Approximately 50 percent were working toward the supplementary authorization and the other 50 percent were seeking an additional authorization. The relatively high attrition rate was purportively due to the speed and demands of the program, the lack of systematic credential counseling, and the inattention to modeling appropriate methodologies for this participant group.

Costs at public and private institutions varied, but the average cost per participant was $3,930, with tuition, fees, and materials being paid by the grant.

Feedback from participants and the training institutions collected by the Los Angeles County TEC Center as part of a formative evaluation indicated five major concerns:

1. Teachers need a refresher mathematics course before entering the prescribed math course.
2. The required math courses necessary for credentialing are too extensive to be completed by participants in one year.
3. College/university mathematics methods courses do not currently emphasize effective teaching methods related to mathematics teaching.

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4. A one-year training model does not allow adequate time for training in mathematics methods.
5. Instructional methodologies appropriate for K-12 mathematics instruction need to be modeled by college/university instructors.

Staff Development Strategies and Delivery Models

SB 813 directs the TEC Centers to provide staff development services to school personnel through several different modes. First, the centers are responsible for providing training to increase the knowledge and skills of teachers and other school personnel. Second, the centers are responsible for providing services to better enable school staffs to plan and conduct their own staff development activities. These services are referred to as "capacity-building." Third, the centers are directed by SB 813 to provide computer demonstration and training sites where teachers are trained in instructional uses of the computer. In summary, then, the TEC Centers are responsible for providing direct training and for providing services that are capacity-building.

There is considerable variety both within and among the 15 TEC Centers' in-service delivery modes as well as in the specific content of training and services. Although all centers are engaged in providing both direct training and capacity-building services, it is possible to describe the relative emphases of different centers in approaches to service delivery. In this section we examine current service delivery models in the TEC Centers in terms of their feasibility and likely impact on the professional development of school personnel.

The TEC Centers are faced with an enormous challenge of trying to make a major contribution to the continuing education of teachers in California with an average of three or four full-time professional staff in each of the 15 Centers. TECC staff are caught between the pressure to do many things at a

relatively superficial level, on the one hand, and a recognition on the other that the only way they can have a major impact is by leveraging their influence in various ways, especially through partnerships with other agencies, through "training-of-trainers" strategies, and through other capacity-building services.

The TEC Center directors recognize that they face two major challenges. One is to leverage the efforts of a few people operating with relatively small budgets. The other is to offer high quality training and services that lead to sustained gains in knowledge and skills. The directors in fact devoted most of their meeting time, as well as a substantial effort outside their meetings this past year, to developing and discussing concept papers that might guide them toward more effective service delivery strategies. Implicit in this endeavor is the recognition that much of the current emphasis in service delivery approaches is different from what staff would like it to be and how they envision it in the future.

In our interviews and in the directors' discussions about training we repeatedly heard criticism of single-session, large group workshops generally referred to as "one-shot" training. This training strategy was facetiously labeled "spray-and-pray." Nevertheless, the single-session training is a typical delivery model, with approximately 51 percent of TECC courses during 1983-84 in this mode. Although there certainly are some topics that can be appropriately or thoroughly covered in a single session, such topics are typically low-level and informational instead of being directed at sustained behavior change. It is generally agreed that the major portion of TECC resources should be directed at effecting significant and sustained changes in teaching behavior that will be reflected in student learning.

It is instructive to note that the difficulty in providing more training of longer duration with appropriate follow-up is neither new nor peculiar to the

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TEC Centers. There is, in fact, a long-standing concern about this problem within the staff development field. To illustrate, a study of staff development in California done under contract to the SDE in 1979 concluded that "staff development tends to be provided in relatively small amounts per teacher and does not allow for sufficient follow-up to support new ideas or skills introduced by training."[3]

Given the large size of many TECC regions, the large number of teachers to be served, and the overwhelming demand for training in the computer area, it is easy to understand how the TEC Centers have been pressured to provide many single-session courses with little follow-up. This approach is what prompted one county official to describe the TEC Centers as "a mile wide and an inch deep." A good deal of TECC-sponsored training is conducted by trainers working under contract, with varying degrees of training expertise and of monitoring for quality by TECC staff. However, we did observe wide variation among centers in training approaches, including numbers of training sessions and sequencing of courses. One policy board directed staff to offer courses lasting a minimum of nine hours. Eighty-seven percent of the training offered by that center during the past year consisted of two or more sessions. By contrast, in another TECC region, only 22 percent of training consisted of two or more sessions. To a certain extent this variation may relate to geographic features of the regions (e.g., distances that teachers must travel to attend courses), but the training policy of the one center clearly made a difference in the types of courses offered.

The level of training offered is also a matter of concern. During 1983-84, 79 percent of all courses provided by the TEC Centers were at an introductory level.

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[3] Recommendations for the Evaluation of Staff Development in California. Sacramento: California State Department of Education, 1979.

We encountered wide variation in the extent to which TECC staff were engaged in ensuring the quality of contracted trainers and cadres of volunteer trainers. Some centers provide orientations or even intensive training to their trainer cadres (see discussion below on "training-of-trainers" approaches) while other centers rely on reputations of trainers for quality control. In most instances TECC staff have little opportunity to monitor trainers closely, but nearly all centers have workshop evaluation forms on which participants rate the effectiveness of both the presenter and the content. One director told us that trainers who receive low ratings are required to attend instructional methodology training sessions to improve their presentation skills.

Although most TEC Centers conduct a majority of their training under contract, most TECC staff are trainers also. At a few centers TECC staff conduct nearly all of the training. In the long term the centers will have to rely on trainer cadres and other leveraging activities to meet the needs within their regions.

TECC directors and staff have devoted a good deal of attention to a strategy referred to as "training of trainers." This strategy, at its best, has a multiplier effect in which successive groups of trainers train new participants/trainers while at the same time maintaining the highest possible staff development standards. Most centers have already conducted, or plan in the near future to conduct, some type of training-of-trainers activities; and there seems to be a consensus among the group that this will be a major thrust of future TECC activity. A frequently cited example of a successsful trainer-of-trainers effort is the Effective Classrooms Training program, which was originally sponsored by the SDE and is now offered through several TEC Centers.

One center director who has taken the lead in developing the training-of-trainers model has outlined both the distinguishing characteristics and

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the practical impediments to this strategy. Not surprisingly, success of the model depends on selecting participants (i.e., trainer candidates) who have both subject area expertise and strong aptitude as trainers, as well as a commitment to be available as trainers over an extended period of time. Candidates are provided intensive training in content and presentation skills and coaching in the application of such skills while they are conducting their own training.

There are various impediments to developing and maintaining a high quality training-of-trainers program. The first is in the selection of the participants/trainers. LEAs are not consistently willing to release the individuals whom TECC staff would most like to have as candidates. Limitations on release time are also largely responsible for the high "burn out" rate of trainers who are unable or unwilling to sustain their training commitment over a long period. Thus, centers which have implemented this model report problems in the quality of trainers (especially successive generations of trainers) and in attrition of trainers. However, the greatest impediment to the training-of-trainers model is that it is so resource-intensive for TECC staff. We were repeatedly told that success depends on consistent coaching and follow-up. Indeed, follow-up--whether provided to the training-of-trainers model or any other staff development activities--was consistently cited as one of the hallmarks of good staff development and as something too resource-intensive for the TEC Centers to do on an extensive basis at this time. One director indicated that the opportunity to provide follow-up support to training was "a dream, but hopefully not a pipe dream."

It has long been recognized that sustained professional development of school personnel requires a commitment at the local education agency (school and district) level. From the perspective of a regional staff development

network, such as the TEC Centers, the optimal strategy--both in terms of impact and of resource management--is to empower schools and districts to plan and conduct their own staff development programs, with the regional centers facilitating the planning process and linking LEAs to staff development resources. Hence, the emphasis on capacity-building approaches in SB 813 and in the TECC directors' discussions. This recognition is also long-standing within the staff development field and in state-level educational policy. In 1977 the California Legislature enacted Assembly Bills 65 and 551. AB 65 includes a provision to support comprehensive locally planned school site improvement programs, in which staff development is a major emphasis. AB 551 included statutory provisions and funding to support local school site staff development programs and regional School Resource Centers. The TEC Centers have now taken over from the former School Resource Centers the responsibility for supporting local staff development programs and have the additional responsibility of administering the grants to school sites funded under AB 551 (see also the section on AB 551).

Several centers have attempted to make capacity-building services a major focus of their activities over and above the services that relate directly to AB 551 grants. Some centers have established small grant programs through which awards are made to LEAs or to individual teachers to enable them to participate in staff development activities. In addition to the improvement of skills which may result from the activities funded by these grants, other benefits are the money itself, which can be used for release time or other direct expenses, the prestige associated with receiving a competitive grant award, and the commitment to ongoing staff development which is implied in putting together a staff development plan in the application process.

A few directors also told us that they spend time consulting with schools or districts to assist them in developing staff development plans which are

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not tied to any application for special funding. In our judgment, and in the judgment of a number of the directors, such services epitomize the best role for the TEC Centers in contributing to the professional development of school personnel. That is, TECC staff could have the greatest impact on school personnel by assisting schools and districts in developing staff development plans and linking them to the resources needed to carry out those plans, with the major impetus for staff development coming from the LEAs. To some extent TECC staff and policy boards may have neglected to develop and market these capacity-building services. Many policy boards seem to favor the more visible direct training activities. However, a more significant barrier, in our view, is the current lack of incentives for LEAs and LEA personnel to actively engage in staff development. The TEC Centers will not be able to exert an optimal influence on school personnel until a local commitment to staff development is built. Some of the factors which prevent such a commitment include: (1) resistance by local administrators and governing boards to granting release time to teachers; (2) unavailability of substitute teachers (there are critical shortages in some areas); (3) lack of incentives for teachers to participate in staff development activities which can appropriately be conducted outside of school time; (4) lack of sufficient numbers of qualified trainers; and (5) the real or perceived ineffectiveness of many staff development programs. So long as these factors remain unsolved, the TEC Centers will probably have their greatest success in continuing to sponsor training for individuals on an open-enrollment basis, at the expense of having an impact on entire school staffs.

We asked center directors how they might envision a role for the TEC Centers some years hence, assuming that some of the barriers to their effectiveness could be overcome and that resources were not an overwhelming constraint. Summarizing from these discussions and from our own view, we believe that the

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TEC Centers will always have a role in providing some direct training although training will (should) consume a smaller portion of their total resources than at present. The TEC Centers hopefully will retain state-of-the-art expertise in instructional applications of computers. Responsibility for awareness level computer training will shift more and more to the district and school level, with the TEC Centers spearheading higher level training as well as consultation on hardware and software. According to this vision, TECC staff will function as regional staff development experts in computers, math, science, and instructional methodology, assisting school and district personnel in planning their own staff development programs and then linking them to the best available resources. We had the opportunity to see a statement of philosophy adopted by one policy board which captures many elements of this role for the TEC Centers:

- The philosophy of the [Teacher Education and Computer Center] is to assist individual schools to plan, implement, and evaluate staff development programs designed to meet specific identified needs.

- With assistance from TEC Center staff and through the application of school initiatives, quality staff development programs will be designed stressing the critical areas of math, science, and computer education.

- The TEC Center will use the training-of-trainers model as a philosophical base to obtain the number of qualified trainers that will be needed to implement this plan. The center will be a strong link in the network of staff developers and will serve as a clearinghouse for resources, consultants, research findings, as well as microcomputer software.

Successful capacity-building strategies are already being used in some TEC Centers. As examples, in both a relatively sparsely populated, large region and in a large, populous urban region the TEC centers are currently devoting most of their staff time and financial resources to empowering local school staffs to plan and conduct their own staff development programs.

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Organizational Relationships Involving the TEC Centers

The TEC Centers have a complex organizational and governance structure, with various leadership roles and lines of authority shared by regional policy boards and executive boards; local education agencies (i.e., county offices of education designated to administer TEC Center budgets); and the Superintendent of Public Instruction. SB 813 also conveys a legislative intent that the TEC Centers will constitute a statewide staff development network and that within their own regions individual TEC Centers will take an active role in developing partnerships with other staff development providers, IHEs, and business and industry.

In addition to having a complex governance structure and a very ambitious mandate for creating regional staff development networks, the TEC Centers are still quite young. Consistent patterns in their organizational relationships will be more clearly discernible in the next two to three years. It was partly for this reason, as well as the sheer difficulty of the task, that we did not explore most of these relationships in depth during this evaluation. We did, however, devote considerable attention to examining relationships between the TEC Centers and the SDE because this seems to be an especially critical time in the development of their respective roles in the TECC program. To a lesser extent we also studied relationships among the 15 TEC Centers and partnerships with business and industry and with IHEs. This section includes a description and analysis of these relationships.

Several TECC directors and policy board members commented on difficulties in clarifying local governance roles. These difficulties appear to reflect ambiguities or disagreements in the respective authority and responsibilities of policy boards, executive boards, and host LEAs. A few interviewees said that it would be helpful to have regulations to clarify roles, responsibilities, and

authority of the various groups. To some extent the potential for conflict seems to be built into the system, which represents a compromise between a teacher-dominated and an administrator-dominated governance structure. At this time individual TEC Centers seem to be dealing with this complexity with varying degrees of success. In a few regions, we developed the strong impression that the TEC Center is operating as a unit within the host LEA, with a relatively weak role for the local policy board and relatively little identification with the TEC Center network as a whole or a statewide mission. In some other regions the TEC Center has a definite regional orientation and receives most of its direction from the policy board. Clearly, the issue of relationships between TEC Centers and county offices of education is a delicate one. Since the TEC Center network is still relatively new and generally well regarded, some county office staff may fear that the TEC Centers could be the harbinger of some larger regionalization move. Certainly it would be regrettable for the TEC Centers to carry the baggage for this much larger debate.

Relationships with Business and Industry

SB 813 stipulates that TEC Center policy boards have at least one representative from business and industry. The TEC Centers are also encouraged to identify and procure resources--both financial and instructional--from business and industry. Because the private sector is considerably more sophisticated in computer technology and more resource-rich than the educational community, the TEC Centers are encouraged to identify and pursue private sector resources. We did not study in depth the TEC Center efforts to develop these partnerships, but our observations corroborated the findings of the evaluation for 1982-83: TEC Centers were the most successful in building partnerships with the computer industry, while their relationships with other businesses and industries were limited. Only two of the 15 TECC directors described a substantial amount of

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activity around developing these partnerships. The most successful of these is housed in a county office which has made partnerships a major officewide commitment. Several TECC directors expressed frustration in this area and are unsure both about the incentives for business and industry to get involved and about how to maintain equality in the partnerships. For the most part, the TEC Centers have not yet devoted a major effort toward forging connections with business and industry. One director commented, "There is something there to be tapped, but it is a low priority."

Relationships with IHEs

The formal link between the TEC Centers and IHEs occurs as the result of SB 813 language regarding composition of the TEC Center policy board: ". . . at least one representative of institutions of higher education which maintain a department of education and which are located in, or adjacent to, the area served by the center selected by these institutions. In the event that more than one representative is selected, the additional representative or representatives shall not represent the same segment of postsecondary education." This linkage, connecting a major staff development delivery system with the teacher training system, was designed to encourage cooperation, to foster sharing of resources, and to tie in university credit for TEC Center trainings.

The best example of coordinated effort between the centers and IHEs occurs with the California Math Project. There is an additional incentive for cooperation, however, in that IHEs are under mandate (SB 424, Chapter 196/1982) to involve the TEC Centers. In a typical project the TEC Centers provide the advertisement, the computer equipment if needed, the physical space if required, and the resources for the teaching methodology component of the training. The IHEs, for their part, provide the curriculum content and instruction for the training. Notwithstanding the above example, we found

that, in general, the link between the TEC Centers and IHEs is rather weak, not so much the result of disinterest but of disjointedness of mission. The TEC Center training is generally designed for "re-tooling" and not retraining, with the exception of the Los Angeles Math and Science Retraining program (see also the section on retraining). Some other factors which relate to the weak link are:

- The TEC Centers are overwhelmed and overburdened in their primary mission and have little time to nurture IHE relationships beyond where they are now.
- Most TEC Centers offer university credit for jointly planned IHE/TECC training; however, university credit, in itself, is not a strong incentive for teacher participation.
- The most successful TECC/IHE activities occur where there is a specific mandate for joint planning and implementation of a program.

While we devoted limited time studying this issue and did not interview IHE representatives, it is clear from our conversations with TEC Center directors that the link with IHEs is limited. A few directors mentioned, and we concur, that more formal incentives along the lines of the California Math Project are needed if additional cooperative effort is desired.

Relationships Among the 15 TEC Centers

Although the 15 TEC Centers vary widely in geographic and other characteristics, they do constitute a regional staff development network. Building a network that is responsive to both regional and statewide staff development needs will require substantial communication and sharing of strategies among the various centers.

Various kinds of informal and formal communication currently go on among the TEC Centers. Several center directors told us that they have frequent

telephone contact with other directors and rely on this network for advice and sharing of ideas. Indeed a number of the TECC directors were previously associated with School Resource Centers or PDPICs and have long-standing collegial relationships that predate TECC. Since these informal contacts are based on familiarity and trust, it is natural that not all directors are equally tied into the network.

During 1983-84 the center directors met as a group approximately once every two months. On the whole the directors seem to feel that these meetings are extremely useful in stimulating the sharing of ideas and strategies as well as in promoting the development of the statewide network. Superintendent Bill Honig met with the directors at their September meeting and urged them to develop a consensual definition of major issues and approaches in staff development. This session stimulated a major effort by the directors to develop a set of concept papers as their statement on the "state of the art" of staff development. Subsequent meetings during the year were devoted in large part to presentation and discussion of the substance and implications of the concept papers, including an open session at the annual Staff Development Conference at Asilomar. The concept papers address the following areas: (1) Strategic Planning; (2) State of the Art of Staff Development; (3) Training of Trainers.

The consensus among those directors involved in developing the concept papers is that the process they have engaged in is at least as important as the products. Given the absolutely overwhelming staff development needs in the state, there is a general expectation that the TEC Centers must be much more than a dissemination network for existing training programs. Indeed the expectation is that the TEC Centers, as part of the larger educational reform movement, will help devise staff development strategies that are substantially more effective than previous strategies. By developing statements on staff

development as they envision it at its best, the directors have set some goals to strive for as well as determining staff development needs for their own staffs.

Overall, the meetings of the TEC Center directors (and occasionally some of their staffs) have been successful in building the effectiveness of the TEC Centers as a regional staff development network. The meetings have promoted group cohesion and identification of the directors with a significant leadership role in staff development for the state. They are a forum for exchanging ideas and practices and airing concerns and are the principal point of contact between the TEC Centers and the SDE at this time.

One implicit purpose served by the directors' meetings is that of quality control. By focusing many of their discussions on the elements of effective staff development the directors are challenged to improve their training and service strategies. It is hoped that this activity will be of particular benefit to those centers that are functioning below the "state of the art." As one director put it, "Within the TECCs we have the same continuum of quality as in the field. Some TECCs say they are different and use this to hide behind--this is the fear reaction to change. The system needs to police itself. Eventually merit becomes an issue. The meetings are helping to bring along those centers which are not doing their job."

Since the meetings of the directors serve such an important function, we believe that the TECC network would benefit from a more comprehensive and systematic approach to the issues addressed as well as attention to the interests and concerns of the centers whose participation has been minimal. Even from those directors who have attended regularly we hear that there is a need for more meetings covering more issues as well as a need for more careful planning of the meetings and advance notice. Although the meetings have gone rather well

this year with an ad hoc leadership and planning effort, we feel that the group should consider formalizing the process, including, perhaps, leadership roles and responsibilities.[4] Clarification of the range of purposes and issues that could be covered by such meetings would also be helpful as well as a process for assessing the needs of directors who may not have "bought in" to the current meeting format and topics.

Our view is that such problems as there may be in the directors' network are more a reflection of the extent of their needs than any deficiencies in the meetings that have been held. In addition to collegial support and discussion of theoretical staff development issues, the directors need to be able to look to the network for ideas or resources that relate to their spectrum of operations. Some of these needs are at the level of sharing approaches to such practical matters as budgets, staffing patterns, and contracted services. Other needs pertain to developing or adapting strategies for accomplishing aspects of their mission that may be especially problematic--training strategies in science, development of partnerships with business and industry, and promotion of site-level staff development plans are a few examples. Clearly these needs go way beyond anything that can be met by occasional meetings of the directors. Perhaps a starting point for the directors would be to discuss or assess their needs from the network, including needs which might require additional state-level resources, such as training resource centers devoted to major portions of the TECC mission.

Role of the State Department of Education in Relation to the TEC Centers

The Superintendent of Public Instruction (and the SDE) had the major role in designating the number and location of TECC regions and has final authority for the TECC program. Education Code Section 44680.08 directs the State Board

[4] In May the directors voted to have a steering committee to act as liaison with the SDE.

of Education, in conjunction with the Superintendent, to adopt any rules and regulations that might be necessary to implement the TECC program. As of this date, no such regulations have been proposed. The SDE also approves plans, allocates state funds to the centers, and evaluates the effectiveness of the centers. In addition to these administrative responsibilities, the SDE has a major statutory role in coordinating and facilitating communication among the centers, making exemplary program models available to all centers, and providing for an educational software library.

The major contact between the SDE and the TEC Centers is through the Staff Development Unit (SDU) (formerly the Office of Staff Development). Consultants within the SDU are assigned to each of the 15 centers and are available to assist TEC Center personnel, executive board members, and policy board members. The SDU also plays a role in convening and facilitating meetings of the TECC directors and providing other information and resources to TECC staff.

Other units within the SDE whose activities relate to the TECC mission and services include the following: (1) Educational Technology; (2) the various curriculum units (especially those for math and science); (3) School Leadership Unit; (4) School Improvement Program; (5) the Program Evaluation and Research Division; and (6) the Office of Regional Services. At the beginning of the 1983-84 school year, Superintendent Bill Honig and representatives of the various SDE units spoke to the TECC directors presumably in order to set the stage for more active cooperative activities between the SDE and the centers.

The TECC program was originally seen as a vehicle for bringing California educators into the "information age." The Honig administration and SB 813, with an emphasis on reform of curriculum and instruction, have recast the TECC mission so that computers become one tool for improving curriculum and

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instruction. It understandably takes time for new leadership to put its imprint on a major program and to gain commitment to the new mission in the field. More specifically, it has taken time for the SDE to translate the new mission into strategies for staff development.

At the time that the TEC Centers were planned and established, there was intense involvement in their implementation at the highest levels within the SDE as well as in the Governor's office and the Legislature. There is less practical need for the SDE to be closely involved in procedural matters now that the TECC Centers have been in operation for nearly two years. Some TECC directors interpreted the decreased involvement of the SDE as a loss of interest. As one director put it, "We have gone from being a blood child to a stepchild." The disengagement has taken place on both the SDE and the TECC sides of the relationship and seems to have arisen, at least in part, from the complexities and ambiguities in the governance of the TECC program. In particular, it is unclear how the melding of statewide staff development needs and regional needs is to be accomplished and how the SDE can facilitate linkage between the TEC Centers and other staff development resources. Given this ambiguity and the value which the SDE places on local autonomy, the SDU kept a low profile partly to avoid any hint of interfering with the regional governance structure. The SDU adopted the stance that the TEC Centers are relatively self-sufficient and will ask for help when they need it. Concern about the disengagement was expressed to us by TEC Center directors, policy board chairpersons, and SDE staff. Because interest in and expectations for the TEC Centers remain extremely high, a strong relationship between the centers and the SDE seems important to maximize success of the TECC effort.

The TEC Centers are still quite new, and their relationships to other staff development providers, local educational agencies, and the SDE are still

evolving. There is no doubt that they are already playing a significant role in professional development of school staff, especially in introducing microcomputers into the instructional process. The extent to which the TEC Centers can contribute to addressing the massive professional development and retraining needs in California depends on numerous factors, one of which is a strong cooperative relationship with the SDE. The SDE is, after all, uniquely positioned to influence state-level educational policy; and the TEC Centers currently have a stronger opportunity than any other local agency to effect partnerships among all of the regional and local agencies which can contribute to solutions of our staff development needs.

In general, there is a need for the SDE to provide more direction to the TECC program. We understand the reluctance on both sides to enter into a relationship in which the SDE usurps control or imposes direction in a "top-down" manner. However, this impasse can be sidestepped if the SDE leadership role is construed not in terms of control but in terms of linkage, facilitation, and involvement in cooperative endeavors.

Late in the spring of 1984 the SDE initiated meetings with the TECC directors as a whole and with a smaller steering commmittee to develop a closer and more cooperative working relationship. Both the SDE and the directors seemed to recognize the importance and timeliness of this endeavor. Both parties now seem more committed to developing stronger ties and to clarifying their respective roles in the TECC program.

Major Accomplishments and Challenges of the TEC Centers

One purpose of this evaluation was to summarize the major accomplishments of the TEC Centers to date and to identify the challenges that the TEC Centers must meet. These judgments are based on a synthesis of all the information gathered for the study.

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Major Accomplishments

In less than two years the TEC Centers have:

- Become an effective regional staff development network
- Adapted to a complex governance structure
- Begun to implement delivery models that use the most effective staff development practices
- Made great progress toward bringing computer awareness and skills to California teachers
- Successfully assumed responsibility for administering AB 551 programs
- Provided training to school staffs in instructional methodology, math, science, and other areas of the curriculum
- Begun to create partnerships with IHEs, business, and industry

Challenges

The major challenges that the TEC Centers must meet are as follows:

- Provide comprehensive staff development services with limited resources.
- Respond to regional and statewide staff development needs over time.
- Provide training that is more intensive and includes follow-up.
- Provide more services in support of site-based staff development programs.
- Remain state of the art in instructional uses of the computer and educational software.
- Provide more computer training that is integrated with curriculum.
- Increase services in math, science, and other areas of the curriculum.
- Increase partnerships with IHEs and with business and industry.

Not surprisingly, some of the significant accomplishments of the TEC Centers are closely related to the challenges that they must now meet. As

relatively new agencies the TEC Centers have made a commendable beginning in becoming an effective regional network and in providing many of the staff development resources and services that compose their broad mission. They are already a high-payoff investment in educational reform. Their challenges for the future are to increase the breadth and depth of their services, to the extent that resources and the state of the art permit, and to strengthen their role as major staff development providers in California.

One of the major organizational issues is whether it is reasonable to have staff development agencies that each serve a region, and, if so, regions of what size and configuration. On balance the complex governance structure was carefully worked on in the legislation, has required enormous energy to put in place, works more or less well, and ought not to be changed in the near future. Similarly, careful thought and negotiation went into selection of the 15 TEC Center regions. It should become apparent within about the next two years whether some of the regions are too large or too populous to be adequately served by a single TEC Center. Similarly it should become evident whether some intervention is needed to maintain the influence of policy boards and of the statewide network and mission in relation to host LEAs and executive boards. While the TEC Centers are embedded within county office structures, and county superintendents exercise veto power over decisions, TEC Centers serve regional constituencies and have different service priorities than the designated LEAs.

Concerns about identifying and implementing the most effective service delivery strategies were the dominant theme in meetings involving the TECC directors and the SDE this year. Although the TEC Centers will always have a role in providing direct training, they are beginning to emphasize more capacity-building services as exemplified by assistance to site-based staff development programs and training-of-trainers approaches. The TEC Centers

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have a long-term goal to provide relatively little direct training themselves but to train others to train teachers and other school personnel. Even now, a large portion of TECC staff time is devoted to consulting with school and district staffs and to brokering or referral of services which they are unable to provide. In terms of continued training activities, the TEC Centers are challenged to provide courses that are more intensive (i.e., of longer duration and greater depth) and that include follow-up.

SB 813 and the entire educational reform movement call for massive improvement and redirection of curriculum and instruction in California. Accomplishing these reforms and upgrading the skills of teachers and administrators will require not only a major commitment of resources but the cooperative involvement of the TEC Centers, counties, districts, schools, the SDE, the colleges and universities, business and industry, and the rich pockets of staff development resources scattered throughout the state. Many are looking to the TEC Centers to become the hub of this effort. More realistically, perhaps the TEC Centers can become the hub of one network among many that will be required to get the job done. At the present time, however, the biggest threat to the effectiveness of the TECC program seems to be overloading the system with too many expectations. Reference to a TEC Center role continually crops up in the Legislature in bills that are introduced or discussed. Last year the SDE was required to look at the feasibility of consolidating the TECC and SERN systems. There are many things that the TEC Centers can do well in the areas of curriculum, instruction, and technology, but it would be perilous to expect them to take on all other staff development services.

The inclusion of a major computer element in the TECC mission has probably been its greatest boon. The introduction of the microcomputer as a tool for learning has been the educational event of the decade in terms of the excitement

and interest that have been generated and the potential for transforming the learning environment. Much of the success of the TECC program at all levels is attributable to the strong thread of computer training and resources (even the acronym connotes the technology theme). The agencies are called Teacher Education and Computer Centers. But so far it is the computer which has carried the banner.

The educational reform movement in California is currently placing great emphasis on strengthening the curriculum. Through SB 813 and current priorities of Superintendent Honig and the SDE, the TEC Centers are being pressed to become part of this curriculum improvement effort by providing more staff development resources combining content and instructional methodology in all areas of the curriculum. Given the relatively minor role that the TEC Centers have had in curriculum so far, accomplishing this will require a significant change of direction. The TEC Centers seem well-positioned to take on these additional responsibilities successfully. As one center director put it, "Computers are the hook that draws people in. But they are, after all, only a tool. Once clients are drawn in, we can begin to interest them in the other things we have to offer." The recent effort by many TEC Centers to offer more computer training that is integrated with content is a natural bridge to more staff development in curriculum. One director expressed a major goal for the TEC Centers when she spoke of striving for a "fine balance" between curriculum, instruction, and technology.

Support and Resources Needed to Meet Challenges

In order to meet the challenges, the TEC Centers should consider increasing their efforts in certain areas by redirecting a portion of their total allocation to such activities, especially curriculum and capacity-building services.

It was evident during 1983-84 that the TEC Centers needed additional funds to accomplish their mission. The Legislature responded to this need and appropriated an additional $5.1 million for 1984-85, giving the TEC Center program a total allocation of $11.78 million. While the mission is so large that it will always stretch resources to provide comprehensive staff development services to California schools, the new allocation will enable the young TEC Center program to grow substantially. In the judgment of the evaluators, the following additional support and resources are now needed to enable the TEC Center program to meet current challenges:

- o Strengthening of the TEC Center network through:
  - A comprehensive planning process for the network linked to assessment of needs and priorities in each region
  - A closer cooperative relationship between the SDE and the TEC Centers
  - An improved data base to document services and training
- o Recognition by the Legislature and others of the danger of overburdening the TEC Centers
- o Action by the Legislature and others to increase incentives for staff development

A three-year plan for the TEC Center network involving TEC Center directors, policy board representatives, and SDE staff would help clarify priorities, based on statewide staff development goals, and determine the type of network resources needed. Clarification of priorities might include: (1) some procedures for assessing statewide staff development needs and goals based on a compilation of regional priorities and needs; (2) guidelines for regional needs assessments; and (3) guidelines for balancing services in technology, instruction, curriculum, and other areas. The plan might also address optimal service

delivery strategies in terms of what the TEC Centers can do best and in-service training needs of TECC staff and policy boards. A component of the plan devoted to network support services might provide focus for TECC directors' meetings and conferences and clarify needs for specially funded services, such as institutes on major areas of TECC training, assistance in dissemination of successful training strategies, promotion of partnerships between TECC Centers and other agencies, and incentive programs for local staff development.

Appendix A

TEC Center Statutory Authorization:

Chapter 498, Article 2 (SB 813, Statutes of 1983)

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44680. As used in this article, "teacher education and computer centers" means those centers established by the Superintendent of Public Instruction to provide those functions previously provided by the state school resource centers and the professional development and program improvement centers.

44680.02. The Superintendent of Public Instruction, with the advice of the county superintendents of schools, shall establish 15 or more teacher education and computer centers in the state in such a manner as to provide staff development resources to all parts of the state.

44680.03. The purpose of the teacher education and computer centers is to provide staff development resources to teachers, administrators, other school personnel, and other persons providing services to schools. These staff development resources shall be provided in all areas of the curriculum, but especially in mathematics, science, technology, and other curriculum areas for which there are significant shortages of qualified, certificated teachers. The centers shall provide these resources in cooperation with institutions of higher education, business, and industry.

44680.04. The teacher education and computer centers shall serve the following functions:

(a) Provide training for classroom teachers and school staffs, including: (1) activities to promote the principal's ability to support instructional improvement and the teacher's ability to diagnose learning needs, (2) the development of program content, (3) the use of multiple instructional approaches, and (4) asssessment of student outcomes.

(b) Provide assistance to school personnel developing site-based staff development programs including: (1) assessment of school staff development needs, (2) development of school staff development plans, (3) training school personnel to train other school personnel, (4) cost-effective use of existing resources, (5) evaluation of local programs, and (6) the awarding of staff development program grants pursuant to Article 1 (commencing with Section 44670) of this chapter, and evaluation of their use.

(c) Provide computer demonstration and training sites where teachers are trained in: (1) the use of computers as teachings aids, (2) the criteria for school acquisition and use of computer equipment and software, and (3) the evaluation of computer-related materials.

44680.05. (a) The county superintendents of schools in each of the 15 regions which serve more than one county designated by the Superintendent of Public Instruction shall jointly designate a single county office of education to act as the local education agency for purposes of administering the regional teacher education and computer center's budget.

(b) The designated local education agency shall:

(1) Approve the center's budget for purposes of receiving and disbursing funds.

(2) Employ staff by contract for purposes of carrying out the center's functions.

44680.06. (a) The county superintendents of schools in each of the 15 regions which serve more than one county designated by the Superintendent of Public Instruction may jointly establish regional executive boards to serve as a forum for resolving problems and reviewing policy issues.

(b) Executive boards shall be composed of all county superintendents of schools within each region which chooses to establish a regional executive board.

(c) Executive boards may change the designation of the county office of education to act as the local education agency for the teacher education and computer center.

44680.07. The Superintendent of Public Instruction shall do all of the following:

(a) Designate the regions within the state to be served by teacher education and computer centers with the advice of the county superintendents of schools.

(b) Approve the plans of each center for staff development.

(c) Coordinate and facilitate communication among the centers by, among other things, making exemplary program models available to all centers.

(d) Authorize the allocation of funds to centers based on the approved plans. Funds appropriated or apportioned for purposes of this article in any fiscal year, may be expended in subsequent fiscal years.

(e) Report, by April 15 of each year, to the State Board of Education, the Legislature, and the Governor as to the effectiveness of the centers in providing, and assisting in, staff development.

(f) Provide for an educational software library and clearinghouse to assist the centers with software evaluation.

(g) Authorize centers to receive federal funding for any of their functions.

44680.08. The State Board of Education, in conjunction with the Superintendent of Public Instruction, shall adopt rules and regulations necessary to implement this article.

44680.09. Each teacher education and computer center shall be governed by a policy board of at least 12 members composed of the following:

(a) A majority of the board shall be composed of classroom teachers selected by teachers. Teacher representatives shall reflect the makeup of elementary and secondary teachers to be served by the center.

(b) Persons designated by the school districts served by the center, including at least one parent of an elementary or secondary pupil and at least one principal.

(c) At least one representative of institutions of higher education which maintain a department of education and which are located in, or adjacent to, the area served by the center selected by these institutions. In the event that more than one representative is selected, the additional representative or representatives shall not represent the same segment of postsecondary education.

(d) At least one representative of a business or industry, who, if feasible, shall be from a business or industry which utilizes, produces, or is otherwise involved with computer equipment and software.

44680.10. (a) Each policy board shall operate pursuant to guidelines established by the local education agency of the region which the teacher education and computer center serves and shall meet as necessary.

(b) Policy boards shall do all of the following:

(1) Determine program emphasis and direct and guide center staff to ensure that staff development services are generally available within the region.

(2) Select center staff, with the concurrence of the superintendent representing the center's local education agency, and contract for other needed services through the county office of education serving as the local education agency for the center.

(3) Offer opportunities for agencies and other parties to be heard at board meetings.

(4) Adopt bylaws to guide board meetings.

(5) Adopt a center budget and plan with the concurrence of the county office of education acting as the local education agency.

(c) Any actions taken by the policy boards shall be subject to all of the limitations imposed by law upon county offices of education.

44680.11. The Superintendent of Public Instruction, pursuant to the purposes set forth in Section 44680.03, may set aside money to fund exemplary projects in teacher education and computer centers which may include any of the following:

(a) Teacher training institutes in math and science, including but not limited to, retraining programs and summer institutes.

(b) Programs to encourage industry and business to exchange personnel and other resources with schools.

(c) Teacher training and parental involvement programs designed to maximize school and home use of educational technology for instructional purposes.

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(d) Assistance to school districts located within the region in the development of educational technology plans, computer education plans, or proposals for reading, math, or science projects.

(e) Advice for postsecondary educational institutions located within the region which have received grants for the purpose of meeting the training needs of the region's teachers.

44680.12. Teacher education and computer centers may apply for exemplary project funding through the regular planning and budgeting cycle.

Appendix B

Instruments Used in TECC Evaluation

- Instructions for Completing Documentation of TECC Training
- Guide for Interviews with TECC Directors
- Guide for Interviews with TECC Staff

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Instructions for Completing Documentation of TECC Training

Within the teaching methodologies and training workshops function, activities are to be recorded by content type. All organized workshops and formal events need to be documented. Use your own judgment for indicating the primary content area (e.g., a workshop primarily on math content, but with some instructional applications would be recorded as curriculum). The six types of content for describing workshops/training programs are:

1. Curriculum. "What is being taught, with what instructional materials." Included are activities which are primarily concerned with materials and document generation, or subject matter instruction. Example: math/science learning modules.

2. Instruction. "How something is taught." Included are activities which are primarily concerned with teaching methodology, learning styles, classroom management, and instructional techniques. Example: workshop on teaching styles.

3. Instructional supervision. "The observation and management of educational experiences by individuals." Included are activities primarily concerned with one person in the role of supervisor helping another person in the role of supervisee to master a professional role. Peer training in clinical teaching and administrative/supervision and evaluation are included here. Example: long-term clinical supervision.

4. School management. "Leadership and schoolwide problem-solving capabilities." Included are activities focused on the school as an organization--how groups interact, how problems are analyzed and acted upon, and how schoolwide improvement occurs. Also included here are leadership training activities, not related to instructional supervision. Example: writing an SIP application; training on how to do staff development.

5. Computer use. Instruction in computer technology. Included are activities primarily concerned with computer awareness, teaching individuals how to use hardware, software, or classroom applications and programming instruction. Example: course in BASIC or PASCAL.

6. Other. Anything which doesn't fit into the first five categories. Included are activities for teacher personal self-improvement. Example: financial planning, personal time management.

All events/activities in which TECC provides organized, formal staff development workshops should be documented here. Record workshop title under primary content category (curriculum, instructional supervision, school management, computer use, other).

Column

1-2 Region number.

Column	
4-13	Last name of person most frequently completing instrument form.
15	First initial of this person.
17-26	Last name of TECC Director.
28	First initial of TECC Director.
30-35	Date of initial entry on this page.
37-40	Number of page in this section--begin with 01 and reproduce as many pages as necessary.
47-60	Enter title of workshop: abbreviate where possible and leave space between words. Example: REM MATH.
62	Indicate level of training (if known): o Enter 1 if an introductory or awareness course. o Enter 2 if comprehensive or advanced training is provided. o Enter 3 if program/workshop is to "train trainers."
64	Indicate availability of follow-up to individual teachers or administrators (regardless of use of number of occasions): o Enter 1 if follow-up is available. o Enter 2 if no follow-up is available.
66-68	Enter total number of sessions in workshop. Example: 004.
70-72	Enter total number of hours participants are in workshop. Sum hours across all sessions. Example: (.04 x 3 = 12).
74-90	Enter number and type of staff conducting workshop. Example: (74-75) 02. (83-84) 02.
92-94	Enter total number of workshop participants.
96-102	Indicate numbers of participants, either from service region or outside service region. Leave blank if unknown.
104-123	Indicate participant job assignments (if known).

Guide for Interviews with TECC Directors

TECC Annual Evaluation 1983-84

TECC Region: _____

Region Number: _____

Name of Director/
Interviewee: _____

Other Staff
Interviewed: _____

Interviewers: _____

Date: _____

Materials Check List

☐ Budget for 1983-84

☐ Master Calendar for 1983-84

☐ Workshop Evaluation Form(s)

☐ Local Evaluation Report(s)

☐ Other Pertinent Documents

List: _____

_____

_____

Comments:

INTERVIEW GUIDE

TECC ANNUAL EVALUATION 1983-84

Organization, Resources and Emphasis

1. Who are the key center staff? What are their responsibilities and areas of expertise? Are there any staff supported by TECC who are not in this location (e.g., satellite staff)?

2. Will you describe for us what you feel are the priorities and goals of your center? How were they developed?

3. SB 813 defines the responsibilities of the TECCs in rather broad terms. How has your center interpreted the TECC mission? Which of the responsibilities mentioned in SB 813 have you emphasized? Are there responsibilities to which your center has not yet devoted a significant effort? If so, what are the barriers to carrying out these activities?

4. May we have a copy of your budget for 1983-84? How do your budget allocations reflect the priorities of your center (e.g., staffing pattern, discretionary funds)?

5. Do you have a cost-reimbursement system for any of your trainings or other services?

6. How are the budget decisions made? What roles do the policy board, the executive board and other decision makers have in the budget process?

7. Describe the three activities on which you spend most of your time.

Planning and Needs Sensing

8. Do you have a master calendar of trainings for the current year that we might have? What procedures do you use to publicize the trainings offered by your center?

9. What has been your approach to planning trainings for this year so that they will best meet the needs of your region?

10. Have you done formal or informal needs assessments? If so, what process have you used and how would you characterize the results?

11. What role does your policy council play in planning the types of trainings offered by your center?

Trainers

12. How much of the training is done by TECC staff and how much is done by contracted trainers?

13. How would you characterize differences between the types of training provided by your staff and those for which you contract or refer to other agencies?

Types of Training Provided

14. What would you estimate is the relative percent of your total trainings this year devoted to each of the following areas?

    a. Computers (including computer awareness, software selection, and any other trainings in which the use of computers is a major focus)

    b. Science

    c. Math

    d. Other curriculum areas

    e. Instructional methodology separate from a particular area of the curriculum

    f. Other (give examples)

15. Have there been any significant shifts in the types of trainings provided by your center since last year (1982-83)?

Computer Training

16. In the area of computers, how would you assess the demand (need) for training in your region in relation to the capability of your center to provide training?

17. Has there been any significant change in the level of computer trainings provided by your center since last year?

18. What would you estimate is the percent of computer trainings provided by your center this year that focus on application of computer skills to a particular area of the curriculum? Would you describe some examples?

19. Optimally, how would you envision the role of the TECCs in computer training three to five years from now?

Math and Science Training

20. Math and science are widely regarded as areas where there are shortages of qualified teachers. What approach has your center taken toward the problem of teacher shortages in these areas? What do you see as a feasible role for the TECCs overall in relation to teacher shortages?

21. What kinds of trainings is your center providing in math this year?

22. What kinds of trainings is your center providing in science this year?

Instructional Methodology Training

23. How would you characterize the overall approach of your center to providing training in instructional methodology?

Client Characteristics

24. Do you feel that you have been relatively more successful in addressing the needs of certain types of clients than others?

25. What involvement has your center had so far in administrator training?

Staff Development Strategies and Models

26. What is the strategy of your center for providing trainings in terms of their length, scope, and sequence?

27. Do you have any procedure for providing follow-up assistance to clients who attend trainings?

28. To what extent and for what purposes have you used trainer-of-trainers approaches?

29. What barriers exist, if any, to following state-of-the-art staff development practices in the TEC Centers?

Evaluation

30. What process do you have to get feedback from participants about the quality or usefulness of trainings provided by the center? May we have a copy of your evaluation form(s)?

31. Do you have any formal or informal procedure for getting client assessments of the trainings after they have had an opportunity to apply what they learned for a period of time?

32. Have you summarized the results of your evaluations in any reports? If so, may we have a copy of the report(s)?

State-Level Support for TECC

33. What types of guidance or technical assistance have you received from consultants in the Office of Staff Development (OSD)? Have these been helpful?

34. Have resources provided by the OSD, such as the TECC Handbook and the AB 551 Resource Handbook, been useful to you?

35. Are there other resources or guidance from the OSD that would be helpful to you?

36. What experience have you or your staff had with the Software Clearinghouse?

37. To what extent do you see TECC as a statewide network with a common mission and goals?

38. To what extent have you participated in the meetings of TECC directors? Have these meetings been useful to you? Are there other activities or issues which should be addressed in future meetings?

Networking with IHEs

39. What relationship exists between your center and the institutions of higher education (IHEs) in your region?

40. Do you conduct joint staff development activities with any IHEs?

41. What can be done to improve linkage with IHEs?

Networking with Business and Industry

42. What relationship exists between your center and business and industry in your region?

43. What kinds of resources are business and industry providing your center?

44. What should the TECCs do to encourage greater collaboration with business and industry?

AB 551 and Site-Based Staff Development

45. What is your approach to managing AB 551 programs?

46. What types of technical assistance do your staff provide to recipients of AB 551 grants? Approximately how much staff time is devoted to AB 551 activities?

47. How would you characterize the major staff development activities funded by AB 551?

48. Aside from AB 551, does your staff provide service to schools in designing or implementing their own staff development programs?

Demand for TECC Services

49. It is widely believed that the demand for TECC services and trainings exceeds their current resources and capability. Is this the case in your region? If so, is there any way to document the discrepancy?

GUIDE FOR INTERVIEWS WITH TECC STAFF

TECC ANNUAL EVALUATION 1983-84

TECC Region: _____

Name: _____

Major Responsibility: _____

1. Will you please describe your job in terms of your major responsibilities and how you spend your time?

2. Are you employed full time by the TECC? If not, what other responsibilities do you have?

3. What is your background? What position did you have before you joined the TECC staff?

(Refer to interview guide for specific questions on computer training and on AB 551/capacity building.)

Appendix C

Summary of 1983-84 TECC Evaluation Survey

SUMMARY OF 1983-84 TECC EVALUATION SURVEY

TECC Region: 14 out of 15 regions

A. Math/Science Training and Services

1. During the period February 16, 1983 to February 15, 1984:

(a) How many math/science workshops in your region (courses, programs, etc.) were sponsored by TECC?

Math: Md=8.5, Range = 4-45 (N=14)

Science: Md=6, Range = 1-25 (N=14)

(b) How many total hours of training were included in those workshops?

Math: Md=130, Range = 27-343 (N=14)

Science: Md=27, Range = 8-228 (N=14)

(c) How many total participants attended these workshops?

Math: Md=140, Range = 63-1,142 (N=13)

Science: Md=[illegible]5, Range = 15-800 (N=14)

2. Which agencies within your region conduct staff development in math/science and approximately what percent of the total activity does each agency conduct?

Agency	Percent of total staff development	
	Math	Science
TECC	Md=25%, based on 13 mentions	Md=30%, based on 11 mentions
County offices of education	Md=20%, based on 11 mentions	Md=20%, based on 12 mentions
Districts	Md=22.5%, based on 8 mentions	Md=23%, based on 8 mentions

Agency	Percent of total staff development	
	Math	Science
IHEs	Md=18%, based on 7 mentions	Md=5%, based on 5 mentions
Lawrence Hall of Science	Md=26.5%, based on 2 mentions	--

NOTE: Other staff development providers mentioned by one center and accounting for at least 10 percent of services were: AB 551 school sites, professional organizations, private consultants, and the Merced Professional Development Center.

3. Do you feel that there is a need within your region for substantially more staff development in math/science than is currently offered?

Math

Yes 13 No 0

Please explain: _____

Science

Yes 13 No 0

4. Do you feel that there is a need for your TEC Center to provide more staff development in math/science than you are currently providing?

Math

Yes 11 No 3

Please explain: _____

Science

Yes 14 No 0

Selected comments:

Perceived need is not adequately documented.

Data would indicate a need for additional in-service; however, teachers are not responding in significant numbers. The need may be apparent, but the motivation for people to attend is not.

There is a shortage of qualified math and science teachers districtwide.

Districts and teachers are requesting math and science services at this time.

Research shows us this is a nationwide problem. Most people in this region are only interested in computers and clinical supervision at this time.

Fifty-seven percent of teachers responding to our needs assessment indicated they were teaching outside their specialty, particularly those teaching math in high school and junior high and those teaching science at the junior high level.

Definitely! One approach we are attempting and will continue to stress is that of integrating math and science into other training (e.g., instructional methods, computers, language arts, problem solving/higher order thinking). It is critical that increased training in math and science be coordinated with district and county efforts and with policy development at the board level.

More programs are needed at the secondary level.

A. *There are many teachers who do not teach math concepts but simply drill on facts and algorithms who have never attended a math in-service.*

B. *There is no way for a practicing teacher to complete a math minor in summer or evening programs at our local colleges.*

C. *Math scores in our area are lagging behind possibly due to ineffective teaching.*

While math has been a high priority in the districts, the vast majority of teachers are naive about sequencing objectives, continuously regrouping students for mastery, teaching problem-solving skills, etc.

1984-85 will have more staff development because the policy board has specifically committed staff and money to these areas.

There is a critical shortage of qualified math and science teachers.

There is a need for an overall competency-based program approach for staff development in mathematics and science. Programs are needed to develop teaching competencies in elementary mathematics/science, in secondary mathematics/science competencies as update training, and for those who were not trained as mathematics/science teachers specifically.

Although science received highest rating from district administrators in our most recent needs survey, very few teachers come to programs offered by TECC and counties. Those high schools planning to implement new graduation requirements seem to just be adding textbook courses designed for grades 7-9. What science that is taught in grades 1-8 involves reading about it rather than doing it.

Our TECC is viewed by clients as a resource primarily when computers are involved in math content.

Traditional staff development methods are not sufficient to attract practicing math and science teachers. Incentives are needed in the form of release time, stipends, and other creative and motivational programs if we are to truly impact quality of math/science instruction in our schools.

We are currently developing a training of trainers through intensive math and science summer institutes.

* If you feel that your center should be providing more staff development in math/science, which of the following account for why your center is providing less staff development in math/science than is needed? Below are a few factors. Please check (/) those which apply and add any additional factors you feel are important.

Math	Science		Math	Science	
9	12	Insufficient resources	8	7	Insufficient time to develop a plan for staff development in math/science
5	5	Lack of client demand			
6	9	Lack of qualified trainers	___	___	_____
			___	___	_____
5	7	Higher priority in other areas	___	___	_____

Selected comments:

Current staff were hired for other expertise. Many districts do not allow release time for intensive staff development in math and science. Some districts cannot obtain substitutes even when they pay them. We need legislation to support retraining efforts. We need an in-depth, well-thought-out plan with follow-up, particularly in science.

The expectation that a certificated staff of 4 FTE can serve the staff development needs of educators in 11 counties with an a.d.a. of 240,000 pupils, in teaching methodologies, supervision, computer uses, and math and science is somewhat unrealistic. More resources are necessary to adequately meet the staff development needs of so many in such a large and diverse region.

Before any of this will be accepted and implemented by more than a few schools and teachers, a massive informational program concerning state direction in testing (in science) needs to be implemented.

A written science staff development plan has just been completed. A math staff development plan must now be done. Higher priority has been given to computer literacy simply because of the overwhelming number of teachers who have requested it.

The math/science specialist position was filled in December 1983. Until that time, staff development in math/science was an add-on assignment to their duties.

We need to become more proactive in regard to creating legislation that will enable us to develop innovative, effective staff development programs in math and science.

5. Are any of the staff development activities in math provided by your TEC Center designed for teachers who are not currently qualified to teach math?

Math

Yes 10 No 3

Science

Yes 7 No 5

Selected comments:

At the elementary level; but not at secondary level.

Will be offered summer of '84--we try to give content and teaching skills to reassigned math and science teacher.

We cooperate with the CA Math Project to offer courses for both the experienced and inexperienced math teacher.

Most staff development activities provided by the TEC Center are designed for teachers who are currently teaching math/science but hold majors in other fields.

We have been working with our local IHEs regarding this problem.

Local IHEs allow outside agencies to offer continuing education credit for courses and workshops, but do not extend the courtesy for any coursework counting toward credentials. Cooperative efforts must be a high priority for the coming year.

There is a critical shortage of qualified science teachers.

There is a lack of appropriate programs for the nonqualified science teacher.

We utilize private consultants to provide science in-service designed to upgrade skills/knowledge of both experienced and inexperienced science teachers.

1984-85 will be our implementation year in science. This year we have been gathering data and developing plans.

6. What can the State do to augment staff development in math/science?

Provide $ for serious, nitty-gritty retraining. Release time or stipends for teachers to genuinely work together to upgrade content and process skills.

Upgrade the level of services available from SDE.

Stop demeaning math and science teachers (upper management tends to generalize about the poor quality of math and science instructors). This does not motivate teachers to seek out growth opportunities, but rather creates a defensive posture, resentment, insecurity, and sense of not being valued--positions that teachers find themselves in all too often.

Provide specific funding for math/science curriculum/staff development specialists in TEC Centers.

Identify exemplary math and science programs and develop a resource guide for TECCs to follow up on. I think it is important for the state to carefully scrutinize those programs that are defined as "exemplary."

Assist districts statewide to redesign the school calendar to facilitate staff development activities on an ongoing basis.

Make curriculum handbooks and addendums available to every district in math and science.

Give the TECCs programs they can replicate--training of trainers packages in math and science.

Provide additional TECC funding earmarked for these areas.

Provide site-level grant opportunities stipulating TECC linkage as a required feature. Give a preference to consortia of schools or districts to promote collaboration.

Help the Centers establish in-service models that will work in large school districts as well as small ones.

Make clear to administrators the need for quality science and math instruction, possibly through a mandate that inquiry, problem solving be taught in all elementary and high schools.

Provide regional training sessions for specific math topics and how to teach them.

The state could augment the 551 funds so that more schools could do more math/science development.

B. AB 551

7. Approximately what amount of TECC staff time (in FTE) is being devoted to AB 551 during 1983-84? Md=.33 FTE; Range=10-1.3 FTE

8. Of the projects currently receiving AB 551 funds, what percent are in each of the following areas?

Math	Md=10.0%	Please list "other" major areas:
Science	Md=10.0%	_____ _____
Computers	Md=77.5%	_____
Other	Md=15.0%	_____
	100%*	

9. What has been the impact of the decentralization of AB 551 administration on your work load and overall program effectiveness?

Selected comments:

The administrative details (paper distribution, accounting, mailing) all are time and material intensive. Needless to say, whatever time is spent on AB 551 is not spent on other.

Decentralization impacts heavily on the administrative work load. However, the impact is worthwhile in that it brings the client and the service provider(s) much closer logistically, professionally, and personally. I believe that all the problems associated with administering AB 551 programs locally are easily offset by the benefits.

AB 551 is beginning to require more technical assistance at the local site level. Schools are asking for assistance in planning staff development programs and identifying resources and assisting in the conducting of workshops at their sites.

Assistance to the AB 551 schools during the year is done by county school personnel assigned to assist schools in effective staff development planning and implementation. This seems to work for both the schools and county personnel and, in some cases, has given the county personnel a much better chance to get into and assist local schools.

The schools like it--they have a local person to contact for technical assistance. It has encouraged TECC staff to become much more involved in individual site planning. This enhances the TECC's ability to spot needs and to plan for regional priorities. It also promotes regional networking. The work load is heavy, and we are frustrated that we cannot allocate the time required to do what should be done to support the schools.

The work load on the center has increased, but there has been a corresponding increase in the effectiveness of local programs.

Programs are more effective because of the availability of technical assistance. Provided adequate technical assistance including many phone

*Percentage breakouts, as reported, often summed to more than 100 percent.

calls, letters, and personal visits in addition to special workshops just for AB 551 committee chairpersons.

It has been a tremendous impact on our work load, but the 551 funds have created a great deal of excitement locally in our region. Schools greatly appreciate direct service by the TEC Center during the complete process of application, implementation, and evaluation. The support has led to more effective programs in the schools.

10. Please comment on the adequacy of current evaluation activities for AB 551 projects.

Selected comments:

Evaluation of AB 551 activities is inadequate. However, no greater evaluation burden should be placed on the recipient schools. Any additional evaluation must be absorbed by SDE or TECC. Many AB 551 schools receive so little funding that it is impractical to ask them to invest substantial time or resources in evaluation activities. All too often we require/request evaluations that are disproportionate to the resources allocated for programs.

The current AB 551 evaluation activities are minimal at best.

TECCs do not evaluate AB 551 schools. We read AB 551 plans and assist when plans are out of compliance; however, site visits are for assistance and networking effective ideas, not evaluation.

Quality evaluation must grow out of quality planning. If we could allocate more time to support the local school planning effort, we would be able to build in more effective evaluation. Current evaluation tends to be narrowly focused, short-term, and superficial. The AB 551 application emphasizes formative as well as summative evaluation, yet the TECC's role seems to be primarily in the area of summative evaluation.

The current evaluation system needs to be revised. Evaluation activities need to foster practices which improve the effectiveness of on-site staff development programs.

Schools are more accountable for use of the money when the TEC Centers have the responsibility for evaluation. If schools are not meeting their objectives, TECCs can assist them. When the state was evaluating, TECCs were not as aware of the needs of the schools.

Annual evaluations stating objectives accomplished appear appropriate. The procedure is simple--not time consuming, yet beneficial. TECC staff have ongoing interaction with these schools so are kept informed as to the school's progress.

Currently, the TEC Center does not have the resources to give adequate attention to evaluation. If we were able to have one staff member with the sole responsibility of the 551 schools, the 551 projects could be monitored and evaluated adequately.

Any other comments?

Selected comments:

Most of our AB 551 schools receive very small amounts of money (under $2,000), but they make excellent use of these funds to further their staff development as an entire school staff.

AB 551 funding should be announced during spring of the year so that schools can have the entire year for staff development activities.

An evaluation document from each district (evaluating AB 551 sites) to TECC would be helpful.

When the TECCs are given a broad responsibility and a "narrow" budget, it forces the Policy Boards to choose what they will do well and what they do inadequately. This may give the false impression that TECC staffs do not know what quality practice is.

Schools receiving AB 551 money are using it very effectively. It brings a school's staff together to work as a team toward a school's mission as well as provides incentives for teachers to improve their teaching skills.

Schools would like to be able to start their staff development program during the summer, but since funds are not approved by the Legislature until the fall and prior year's funds are to be expended by June 30, schools do not have approved funds during the summer. From their evaluations and informal feedback sessions during the year, we have learned that a critical need exists for schools to either have carry-over to use their funds during the summer or else [receive] approval from the Legislature by July 1.

Thank you for your cooperation.

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